MINING WERLD



lo this issue

American Chrome's New Classifier

Dane Va



DRAWPOINT LOADING with Eimco machines is explained in a series of bulletins giving complete data en many jobs including costs accomparisons with chute and grizzly leading. Write for your copies of Eimco L-1017 Series Bulletins.

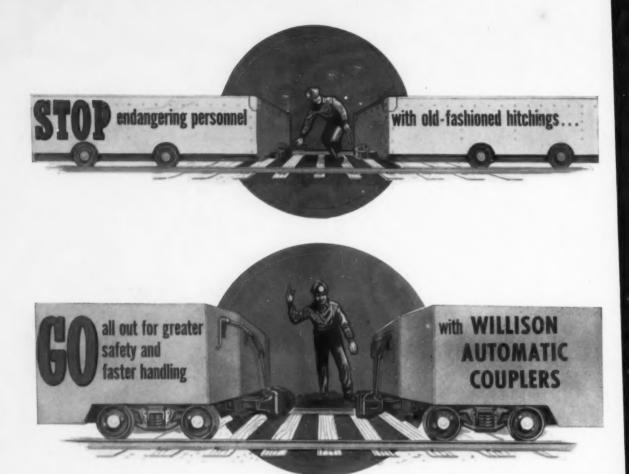
THE EIMCO CORPORATIO

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APRIL 1955

VOL 17 No

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With Willison Automatic Couplers there's no need for personnel to go between cars to couple or uncouple. That means safety—and faster handling because Willisons uncouple from either side. All Willisons couple with each other automatically—there's no matching of coupler heads.

For safety, faster bandling and larger tonnages – Willison Automatic Couplers and National Multi-Pad Rubber Draft Gears.

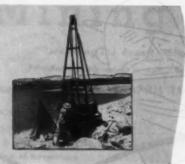


NATIONAL MASSISTEE CASTINGS COMPANY

Cleveland & Ohio

WILLISON AUTOMATIC COUPLERS - RUBBER & FRICTION DRAFT GEARS - NC-1 CAR TRUCKS NACO STEEL WHEELS - NACO STEEL LINKS & SWIVEL HITCHINGS





When you're CORF-DRILING, it's no gamble

with these 3 aces in the hole

22-HD The rugged, heavy-dusy model. Capacity-2000 with EX fittings. Also available as truck-mounted drill or on twin-column mount for underground operation. Bulletin D-28.



12-B Extremely portable, weight approximately 1200 lbs. Capacity—1000' with EX fittings. Also available on twin-column mount with air motor drive for underground operation. Bulletin D-21.



No. 7 The lightweight, easily transportable model. Can be taken underground or transported by airplane, boat, or even muleback into remote areas. Capacity—500' with EX fittings. Bulletin D-24.



CONTRACT COME DIBLIMS Sub-aurface test borings for mineral prospecting, foundation drilling, and grout bole drilling are available on a contract basis. Highly shilled crews and complete stock of core drills, bits, and accessory equipment are maintained at all times.



JOY Diamond Core Drills When these three "aces" go into the holes, luck no longer is a factor. They are a sure bet to tell you exactly what is down there. And, at Joy, you can find the right "ace" to do the best job for you.

With maximum capacities ranging from 500 to 2000 feet, there are Joy diamond drills applicable to almost any coring job. And they'll do the best job for you. Here's why . . .

EXTREME PORTABILITY Skid mountings, compact design, and rugged construction make it possible to drag Joy diamond drills into some of the most inaccessible locations.

VERSATILITY Because they are available with either hydraulic or screw-feed swivelheads and with a choice of gasoline, electric or air power, Joy core drills can fit into any drilling program without expensive preparations.

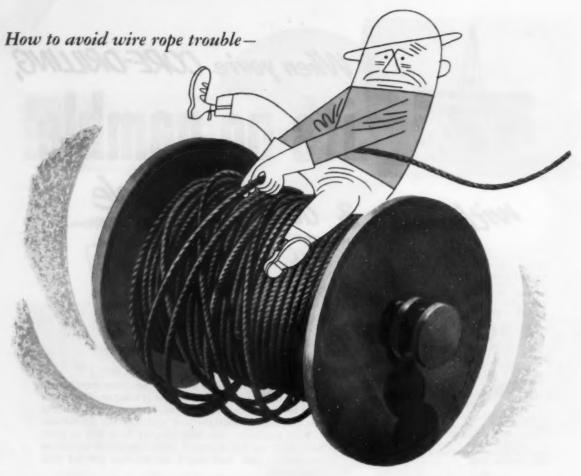
Check your drilling needs against this group of outstanding drills. One of them will be suitable to your needs and it will do an accurate, economical job of proving the mineral value of your property. Write today for literature on the machine you need to Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.



Consult a Joy Engineer

WORLD'S LARGEST MANUFACTURER OF

CORE DRILLS AND MOTORIZED DRILL RIGS
SINCE 1851



Overwinding or crosswinding can cut rope life up to 90%

Because it causes crushing and abrasion, overwinding or crosswinding of rope on the drum greatly reduces rope life. If overwinding can't be avoided, you can reduce spooling problems by checking for undercut drum flanges, improper drum and sheave alignment, or excessive fleet angle. Installation of a "turnback bar", drum grooving, or "line spoolers" may also be profitable.

Most users in the West report less trouble, longer service when they rig up with Tiger Brand Wire Rope. No wonder it outsells all other brands. Want more facts? See your local Tiger Brand Distributor or write United States Steel, 1403 Russ Bldg., San Francisco 6.





USS TIGER BRAND Wire Rope

inited States Steel Corporation—Columbia-Geneva Steel Division In the East: American Steel and Wire Division

UNITED STATES STEEL

Mining World

Including the Export Edition WORLD MINING

Published monthly except in April when publication is semi-monthly

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COVER CIRCLE shows American Chrome Company's 1,000 ton per day gravity concentrator at Columbus, Montana. The American Chrome staff designed and built a hindered settling classifier which gives close size control to table feed. Read the article to find out how this new classifier works.

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MILLER FREEMAN PUBLICATIONS



GRAB SAMPLES From the Mail

Uranium Operator's Views

Dear Sir:

Has anyone commented on your De-cember 1954 article "Basic Economics of Deep Uranium Mining" on page 43? I suggest the following "off the cuff"

figures to be more representative; before taxes etc.:

Exploration-			
"A" orebody 36 holes,	\$92,736		115,000
ea. 800 ft. @ \$3.22		4ining	
"B" orebody 22 holes,	56,672	(70,400)
ea. 800 ft. @ \$3.22			
Surface geology,	20,000		
mapping, assaying et	C		
Camp establishment	7,000	(7,000)
(no mine housing)			
Surface plant	25,000	(8,000)
Surface equipment	18,000	(18,000)
Mine equipment	20,000	- (8,000)
Cross cuts and drifts	28,000	- (28,000)
-1,400 feet		7	
Shaft-800 feet	100,000	()	(000,000)
Total	\$387 408	18	254 400 \

VALUE AND COST TO MINE 1.0 TON OF ORE

For the grade of ore assumed-0.35 per cent U₂O₄ there would be 1.60 per-cent V₂O₄.

CHI V POS.		
ADD INCOME Sale price of uranium content	\$30.25	(\$30.25)
Initial bonus Vanadium income:	1.01 9.92	(1.01)
32 pounds @ \$0.31 Total	\$41.18	(\$31.26)
DEDUCT COSTS Haulage Mining costs, direct	\$1.25 \$12.00	(\$1.00) (12.00)
Depreciation (\$70,000) Amortization of develop	2.03	,
ment and exploration costs (\$297,408) Royalty (assumed in lies	6.19	
of purchase price) 15 percent	0.19	

Total \$30.11 (813.00) Indicated profit per ton before taxes depletion 811.07 (\$18.06) and interest

The value for V₂O₅ that is always present in the Salt Wash member of the Morrison formation was omitted.

You noted in the article that the items depreciation and amortization are

quite an expense.

I feel that your development costs are too conservative and I suggest \$367,408 as against your \$354,400. The interest in my example would be about \$0.71 per ton for the first year.

The whole project could be set up at a lesser equipment and structure cost if used materials were considered.

A 10 percent contingency fund would he advisable.

JOHN W. HILL Worcester Mines

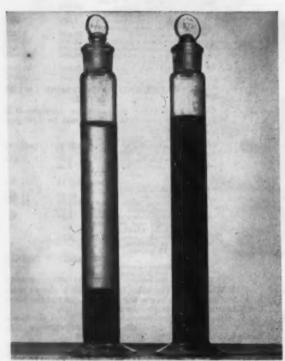
Grand Junction, Colorado. Am very glad that Mr. Hill called my attention to the omission of the vanadium income from Salt Wash ore. I have mined enough of that ore to know better. The contingency fund is a good idea. Mr. Hill's figures indicate that deep uranium mining is even more costly than my estimates. He knows as he is one of the Plateau's deeper miners. Of greatest value to the uranium industry is that the article and the letters to the Editor have called attention to the problems of deep uranium mining. What are your experiences and cost estimates?

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Dow Announces SEPARAN 2610

a superior flocculant



SEPARAN 2610 IMPROVES SETTLING RATE. The cylinder on the right shows untreated ore pulp containing 15% solids. The cylinder on the left containing the same pulp has been treated with .03 lb. SEPARAN 2610 per ton of dry solids. The picture was taken 30 seconds after addition of SEPARAN 2610 and agitation.





SEPARAN 2610 IMPROVES FILTRATION RATE. Filter above shows thin cake formed by untreated material. Filter below shows thick cake collected in the same length of time using SEPARAN 2610. This heavy, porous cake is much lower in moisture than the untreated material.

Under both laboratory and mill conditions, SEPARAN* 2610 has shown the following advantages over other flocculants:

- * Stepped up settling rate
- * Increased overhead clarity
- * Improved filtration rate
- * Decreased filter cake moisture
- * Increased recovery
- ★ And reduced cost—even as low as 1/10 of a cent per ton of solids.

Prove to yourself the advantages of SEPARAN 2610. Send this coupon in today for your trial sample and literature. The Dow CHEMICAL COMPANY, Midland, Michigan. "Trademark

	CHEMICAL					
Dept. TS 7	BBD, Midlan	d, Michigan				
Please sen	d me further	information	and a	trial s	ample of	SEPARAH
Name						
Company_						
Address						

you can depend on DOW CHEMICALS



MARION 4161 SHOVELS

FEET OF ROCK IN CANADIAN MINE

Three MARION 4161 machines are

Stripping up to 100 feet of rock, these heavy-duty shovels

have hard digging all the way. Tens of thousands of tons are loaded every 24 hours.

Look for MARION heavy-duty shovels where the hardest digging is involved on a year-after-year basis. Get the facts on these MARION machines — let our engineers show you what they can do in your mines.





MARION . OSGOOD . GENERAL

MARION POWER SHOVEL CO. . MARION, OHIO, U.S.A.

A Subsidiary of Merritt-Chapman & Scott Corporation

POWER SHOVELS FROM 1/2 TO 60 CUBIC YARDS



DRAGLINES . CLAMSHELLS . CRANES . BACKHOES TRUCK CRANES . MOBILCRANES . LOG LOADERS

Your Confidence Is Justified # Where

Where This Flag Flies

the MARCY* principle of grinding...

"rapid change of mill content is necessary for high efficiency"

This basic principle of grinding is incorporated in all Marcy mills and has proved, in hundreds of installations, to give greater output with lower KWH per ton.



The "rapid change of mill content" is accomplished by use of the Marcy full grate discharge on ball mills and the open end feature on Marcy rad mills. This results in a low pulp line which provides an active, effective grinding mass to act an particle size reduction only... there is no wasteful cushioning action by high pulp levels. There is a faster migration of fines than over-size particles, thus less overgrinding.

operating proof of Marcy Mill superiority

(typical tests conducted independently by operating companies)

LOCATION	Mill Size I.D. Sheil Dia. x Length	DISCHARGE	RPM	% C.S.	HP Input	Tons Per 24 Hrs.		% Gain Capacity	% Power Increase	GRIND	% Capacity Overflow Mill Compared to Grate Mill
Arizona	10½ x 11 10½ x 11	Overflow Grate	16.6	77.6 77.6	665 700	1610 1850	7.40	15	5.2	12% + 48 M.	87
Colorado	6½ x 6 6½ x 5½	Overflow Grate	25 25	79.1	102	160	11.5	41.3	9.8	11% + 65 10% + 65	70
Idaho	6½ x 4½ 6½ x 4½	Overflow Grate	25 25	79.1	75 91	98 127	13.7 12.8	29.6	21.3	1% + 65 1% + 65	77
Mexico	8 x 6 8 x 6	Overflow Grate	22	80	180	660 880	5.1	33.3	22.3	Open Circuit	75
Arizona	8 x 6 8 x 6	Overflow Grate	22	80	197	646 928	10.89	43.7	22.8	6% + 48 5% + 48	70
Canada	6½ x 14½ 6½ x 14½	Overflow Grate	24.5 24.5	81	323 390	1117	5.17	28.0	20.7	8% + 65 7% + 65	78
Colorado	9½ x 7 9½ x 7	Overflow Grate	19	74.5 74.5	287 338	900	5.7 5.5	22.2	17.8	35% + 10 35% + 10	-
Canada	61/2 x 121/2 61/2 x 121/2	Overflow Grate	18.5 18.5	59 59	274 331	945 1289	5.2 4.6	36.4	20.8	15% + 65 15% + 65	73.4

Write for NEW CATALOG No. 101A

Marcy is a registered tradement

Mine & Smelter Supply Co.

DENVER 17, COLORADO

OFFICES IN SALT LAKE CITY, EL PASO, 1775 BROADWAY, N.Y.C.

REPRESENTATIVES IN FOREIGN COUNTRIES



The Model 41 is a real 1 yd. machine built from the ground up as a real 1 yd., able to deliver what you expect from a 1 yd. machine.

The Model 41 will solve lifting and loading problems around the mill. It will build roads and handle drainage work. It will clean out ore pockets and fill in on dozens of other places. It's convertible, of course, from Shovel to Crane, Dragline or Pullshovel by simply changing booms. There is no other 1 yd. rig like it. Ask for a catalog and full details and talk it over with a Northwest Man.

NORTHWEST ENGINEERING COMPANY 1511 Field Bldg., 135 South LaSalle Street, Chicago 3, Illinois

NORTHWEST

Convertible for any Mining Material Handling or Excavation Problem



The New Allis-Chalmers Power Unit Line

Delivers

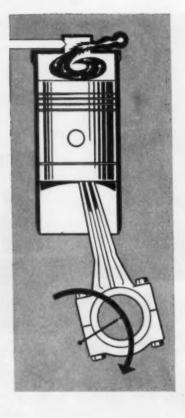
LOWER COST POWER

Allis-Chalmers diesel power units provide a new kind of engine performance and extra-long life. Heart of this outstanding performance is a unique follow-through combustion. Here's how it works —

A blast from the energy cell (see drawing), thoroughly mixes air and fuel for complete burning in the combustion chamber. This results in peak efficiency, lower cylinder temperatures for more complete lubrication of walls, longer life for pistons and rings.

In addition, Allis-Chalmers power units are designed with seven main bearings, rigid blocks, removable "wet" cylinder sleeves, removable valve guides, full-length water jackets, full-pressure lubrication — all contributing to dependable, continuous, long life performance.

Ask your Allis-Chalmers dealer for the visual story revealing the full advantages of these engines.





Five sizes of Allis-Chalmers diesel power units—ranging from 15 to 197 brake hp—are available as open style or complete self-contained units. They are compact and easily installed on donkeys, saw and planing mills, etc.

Illustrated: Model D-779

6-cylinder diesel 140 brake hp at 1400 rpm 779 cu in, displacement

ALLIS-CHALMERS

No long stops to switch drill steels with TIMKEN® interchangeable rock bits



Dozens of different Timken multi-use and carbide insert bits fit the same drill steel!

YOU end costly drilling delays in switching steels when you change to Timken® multi-use and carbide insert bits.

Just unscrew one type of Timken bit and screw another on the same drill steel, right on the job. Makes it easier for the driller to change to the most economical bit as the ground changes. You also eliminate expensive drill steel inventories because dozens of different Timken multi-use and carbide insert bits are interchangeable on the same steel.

Both types of Timken bits are made from electric furnace Timken alloy steel, have a special shoulder union that keeps drilling impact from damaging threads.

Our expert rock bit engineers will be happy to help you solve your drilling problems. Just write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.



WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constantgauge holes, small-diameter holes, very deep holes.



... your best bet for the best bit
... for every job



5D-190 "World's

Exclusive FEATURES of

- World's First 195 H.P. Motor Grader.
- Powered by GM 6-71 Diesel Engine.
- Allison Torquatic Converter.
- Allison Full Power Shift Transmission -eliminates the need for a clutch.
- Tail Shaft Governor automatically adjusts to meet load conditions. Weight of 32,000 pounds — effectively
- distributed.
- Four Wheel Brakes are standard.
- Ground Speeds range from .85 to 20 M.P.H.

For More Details See Your Nearest

The HUBER-WARCO 5D-190 Designed For New High Standards of MOTOR GRADER SERVICE to the Construction, Mining, Coal & Logging Industries

Most Powerful Motor Grader"

For HAUL ROAD BUILDING and MAINTENANCE



the HUBER-WARCO 5D-190

- Power Sliding Moldboard is standard equipment.
- Hydraulically Cab-Controlled Blade Movement—90° either side with no manual adjustments.
- Full 360° Blade Rotation without removing scarifier teeth.
- Mechanical Steering with Hydraulic Booster gives operator perfect control.
- Wheels and 16:00 x 24 Tires are completely interchangeable.
- High Front and Rear Axle Clearance adds to machines' working capacity.

HUBER-WARCO DISTRIBUTOR



HUBER-WARCO COMPANY

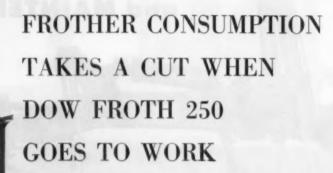
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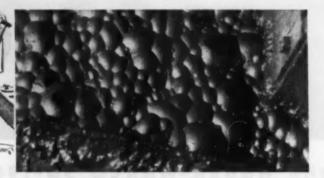
Road Machinery

CABLE ADDRESS: HUBARCO

ROAD ROLLERS . MOTOR GRADERS . MAINTAINERS . GRINDERS







All over the world this product of Dow Research is achieving economies . . . and improving metallurgy

Dowfroth® 250 saves money—this is a fact now confirmed by mill men the world over. Savings are achieved in two ways. Dowfroth 250 builds livelier, easier-handling froth with as little as one quarter the consumption of frothers previously used. Dowfroth 250 also produces improved concentrate grade and metal recovery in mill after mill.

Operators report that they are better able to regulate

frother and collector independently, due to Dowfroth's essentially noncollecting characteristics.

Of course, the superior collectors to use in all flotation of sulfide minerals are Dow Xanthates—tops in recovery records today as they have been for many years.

For helpful technical assistance and the best in flotation agents, always call on Dow. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 816J.

you can depend on DOW CHEMICALS



30%more gypsum on rubber than with tracks

Harris and Allen, Avenal, California; contracted to remove 75,000-yds, of gypsum from the McPhaill Co, pit at Avenal Gap. To handle 95% of the job, they brought in a rubber-tired Tournatractor with a LeTourneau 11-yd. LS Scraper . . . also a 148 hp crawler-tractor with a LeTourneau 18-yd, FP Scraper.

Both units self-loaded the powdery material . . . then hauled 400' to 800' to a stockpile. With project more than half completed, Tournatractor and pan had moved 70% of total yardage . . . crawler and pan, 25%.

187 vs. 104 loose yds. hourly

Even on minimum hauls of 400', Tournatractor's 19 mph speed enabled it to outproduce the 5 mph crawler by 80%. Both tractors self-loaded in 175' to 200', according to contractor records. Tournatractor heaped 11 loose yds, in less than a minute . . . crawler was only able to get 13 loose yds. into its bigger scraper in the same time. Haul of 400', dump, and return of 400' took Tournatractor 2 minutes . . . crawler, 5 to 51/2 minutes. In a 50-minute hour, Tournatractor made 17 trips, for an hourly output of 187 yds. . . . the crawler, with its longer haul time, averaged only 8 trips, for an hourly output of only 104 yds.

In addition to boosting production, Tournatractor paid off in lower maintenance. Because 4 big rubber tires replace about 500 wearing parts of a crawler track assembly, unit needed less lubrication.



If you want to increase production and lower costs, it will pay you to contact your LeTourneau-Westinghouse Distributor before you buy another tractor. See Tournatractor in action on your work.



The recent purchase by Westingbouse Air Brake Company of the earthmoving and related business of R. G. LeTourneau, Inc., combines two firms which are world leaders in their respective fields. It brings together the earthmoving know-bow of LeTourneau and the precision manufacturing and research experience of Westingbouse Air Brake. You can buy from this strong new company with even greater confidence than before. Tournatractor-Trademark T-513-Q-6

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company





...4 tons more capacity at no extra cost

Check these improvements:

4 tons more capacity

Payload of the C Tournapull Rear-Dump has been raised from 18 to 22 tons! Increase was made possible by redesigning the Rear-Dump body to make it lower and wider. Because of this greater width, the "C", loads faster and easier than ever before. At the same time, we have reinforced the bowl to further increase our safety margins. These improvements, plus all the others described here, are available on the new "C" at no extra cost to you.

Better gradability, stability

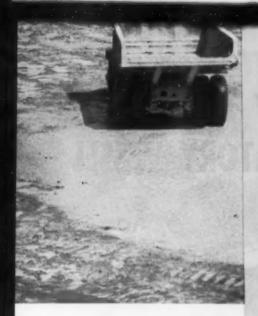
New body design shifts weight forward . . . improves gradability over the previous C Rear-Dump. With this improvement, "C's" grade-climbing ability now compares favorably with any make hauler on any practical haul road. Wheelbase has been increased 6 in., gauge widened to 9 ft., and ground clearance lowered to 22 in. to give you even greater stability . . . improved performance on grades. Overall length in haul position, however, is only 30 ft.

13 to 20% less deadweight

Comparable rear-dumps carry from 2½ to 4 tons of excess iron on their backs. For these extra tons of iron you pay from \$850 to \$5600 more than for a "C". You haul this extra dead-weight both ways on every trip your hauler makes, but add nothing to your earnings. For the life of the machine it costs you bigger fuel bills, higher tire costs due to over-loading, plus greater repair expense because of extra weight and shock on running gear.







"C" Rear-Dump now 22 tons

12% greater horsepower

To power your improved "C" Rear-Dump, you now have a 6-cylinder GM 6-71 diesel with brake horse-power rating of 208 hp at 2000 rpm. With this improved engine, you get quick pickup in starting and gear changes . . . better response at high speeds . . . better grade-climbing ability . . . all adding up to overall faster cycles. 200 hp Buda or Cummins diesels are also available. And, you have choice of sliding-gear or constant-mesh transmissions.



In addition to many improvements in structure and machinery throughout, you get all these job-proved basic features which made the previous C Rear-Dump a successful production units

Houls anywhere — With big rubber tires, Rear-Dump safely travels narrow haul roads, paved highways, city streets . . . hauls cross-country over roughest terrain, through mud, and soft fills.

Reduces maintenance—Because Rear-Dump has no hydraulics, no jack lines, no long drive-shaft, no frame, sub-frame, aprings or tie rods, most common troubles of conventional rear-dump haulers are eliminated.

Dumps fast, clean — A touch of a switch activates hoist motor. Body lifts quickly, swings behind rear wheels to dump clean over bank. Streamlined bowl sheds material readily.

Cuts weather delays — Power transfer differential automatically applies power to drive wheel on firmest footing . . . pulls unit through mud, sand, and soft materials which stop ordinary haulers. It's a Tournapull exclusive.

Works fast in tight quarters — 90° turns within a radius of half of unit's length, plus power steer, quickly position "big-target" body under dipper. No switching back and forth, no turntables.

Eliminates manual work — Finger-tip electric controls on instrument panel activate electric motors at point of action. Heavy manual work fighting steering and control levers is eliminated.

Resists body shock, damage — Three-layer, all-steel, grid-type bowl with tool-steel floor resists loading shocks. Big, wide bowl opening is an easy target for any loading unit.

Improves safety — Multi-disc air brakes have more braking surface on one wheel than most haulers have on 4. Low center of gravity, good visibility, frontwheel drive, easy control also boost safety.

Delivers full power — Torque converter (optional) automatically balances load and torque so you get full hp always. Lugging is reduced; shocks between engine and transmission virtually eliminated.

Reduces fatigue — Big low-pressure tires and air-foam rubber cushion seat smooth out ride for operator. Push-buttons control every action. Fatigue factors are greatly reduced.

Insures future earnings—Behind Tournapull prime-mover, you can interchange acraper, bottom-dump, other trailing units. With them, you always keep these units profitably busy on any type of future operation.

Check for yourself. Your Le-Tourneau-Westinghouse Distributor will supply you with names of Tournapull Rear-Dump owners in your area. Visit the jobs . . . talk to the operators . . . learn for yourself that improved C Tournapull Rear-Dump is the answer to your hauling problem.

There is a size to fit your needs. Besides the 22-ton "C", LeTour-neau-Westinghouse offers similar 9, 35, and 50-ton models.

Serverell-Trademark Reg. U.S. Pet. Off. R-768-G

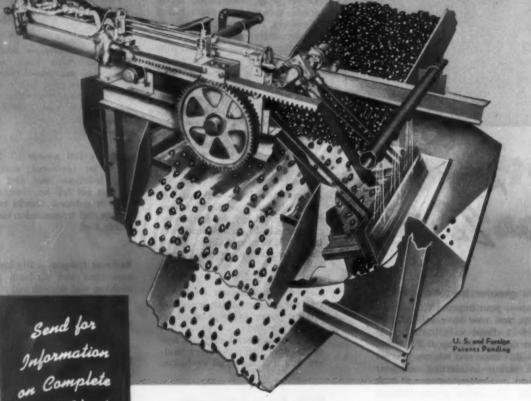
LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

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Announcing A New TYPE HMS SEPARATORY VESSEL



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The new OCC vessel represents the successful realization of the main advantage of the HMS process:—its utter simplicity. The simplicity and efficiency of the OCC vessel are shown by these 6 noteworthy features:—

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- . No rotating parts in the medium.
- Open vessel; separation visible.
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- · Quickly adjustable rake speed.

Complete HMS testing, plant designing and installation services.

THE ORE & CHEMICAL CORPORATION

. Division: Mining & Milling Machinery

80 BROAD STREET, NEW YORK 4, N. Y.

[World Mining Section-16]

MINING WORLD



Cyanamid REAGENT NEWS

"ore-dressing ideas you can use"

Frother problem?

One of these Five Cyanamid

AEROFROTH® Frothers may be the answer.

Cyanamid now offers four higher-alcohol frothers and a watersoluble frother as well as pine oil and cresylic acid. All are liquids which may be used alone or in conjunction with other frothers.

AEROFROTH 63 Frother, a higher alcohol type, has found wide acceptance for coal flotation. It has a controlled frothing action which has proven highly advantageous for easy-to-float minerals such as coal, graphite, sulfur, molydbenite and talc. Produces a more brittle, less persistent froth than pine oil or cresylic acid.

AEROFROTH 65 Frother, a recent addition to the family, is a synthetic, water-soluble frother which produces a closely-knit, selective froth. Mill results have indicated that frother consumption can be reduced to one-tenth to one-third of previous consumption when the switch to AEROFROTH 65 has been made. Produces a less brittle froth than the other AEROFROTH Frothers.

AEROFROTH 70 Frother is a branchchain alcohol producing a more selective and less persistent froth than pine oil or cresylic acid. Widely used in both metallic and non-metallic flotation operations.

AEROFROTH 77 Frother is a straightchain higher alcohol, which has been substituted for pine oil or cresylic acid at many operations, resulting in increased selectivity and reduced frother consumption. Produces a slightly more persistent froth than AEROFROTH 70.

AEROFROTH 80 Frother is the latest addition to our family. A straight-chain, non-promoting alcohol frother, it produces a light textured froth with high selectivity.

Cyanamid Field Engineers will be glad to work with you in your mill to select the frother or frother combination that will give you the highest recovery at lowest cost. With a wide variety of frothers available our recommendations will, of course, be unbiased. Your inquiry to our nearest office will receive prompt attention.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DEPARTMENT

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CYANAMID PRODUCTS, LTD., Bush House, Aldwych, London W. C. 2. England SOUTH AFRICAN CYANAMID (PTY.) LTD., P. O. Box 7352, Johannesburg, Union of South Africa

E. P. CADWELL, Cestillo 12983, Correo 11, Sentiago, Chile G. B. O'MALLEY, MALCOLM GLEN, 377 Little Collins St., Melbourne C. 1, Australia Printed in U. S. A

NORTH AMERICAN CYANAMID LIMITED Royal Bank Bidg., Toronto 1, Onterio, Canada CYANAMID DE MEXICO, S. A., Apartado No. 26012, Mexico 12, D. F., Mexico How Dorr-Oliver engineering serves the mining industry throughout the world...



Gold Mill TONNAGE INCREASED 100% in Brazil

The St. John d'el Rey Mining Company, Brazil's largest gold producer, is a good example of how Dorr-Oliver engineering facilities have been utilized to increase production of existing plants.

Working closely with the client at the existing plant site, Dorr-Oliver engineers studied all aspects of the problem of treating the complex arsenical ore. On the basis of these exhaustive analyses, recommendations were then made for changes in the existing flowsheet.

In Europe: Dorr-Oliver Companies in England, Belgium, The Netherlands, France, Germany and Italy.

In South Africa: E. L. Bateman Limited.

In India: Dorr-Oliver (India) Limited, Bom-

In Australia: Hobart Duff Pty. Ltd., Melbourne.

in Japan: Sanki Engineering Co., Ltd., Tokyo,

The client handled final plant design . . . and equipment purchased from our Associated Company, Dorr-Oliver Ltd., London, proved most advantageous to him.

This is but one example of how the flexibility of the Dorr-Oliver Worldwide engineering organization has worked to the advantage of a client. It can work for you too, through any of the following Associated Companies and Representatives, all with facilities for local manufacture.

In South America: Fiore Company in Buenos Aires; Serva Ribeiro in Rio de Janeiro and Sao Paulo; John Lindsay in Caracas; and conveniently located Dorr-Oliver Resident Engineers.





because it's SELENIUM NEOPRENE

The drawing above, amusing though it may be, is an accurate rendition of one of the problems that faces a cable attached to a drill. Strong sunlight tends to harden some cable jackets and make them brittle. Ultraviolet rays found in the sunlight help to cause cracks by forming ozone. These cracks are the point of entrance for moisture, dirt, water, and more sunlight. Eventually the cable breaks down from these causes.

This is not so with TIREX. Its cured-in-lead Selenium Neoprene Armor will continue to protect the insulated conductors regardless of the operating conditions, including strong summer sun. Samples of TIREX Selenium Neoprene Armor have been exposed to sunlight continuously for nearly twenty years and still show no signs of cracking.

TIREX was made to meet the problems encountered in mining. It was the first heavy-duty portable cord or cable made in this country. TIREX still leads the field by having the toughest, most abrasion-resistant jacket known. If you aren't using it now, why don't you get some and see how much more work you get per length of TIREX. Your local electrical supply house has TIREX in stock, or can get it for you quickly.

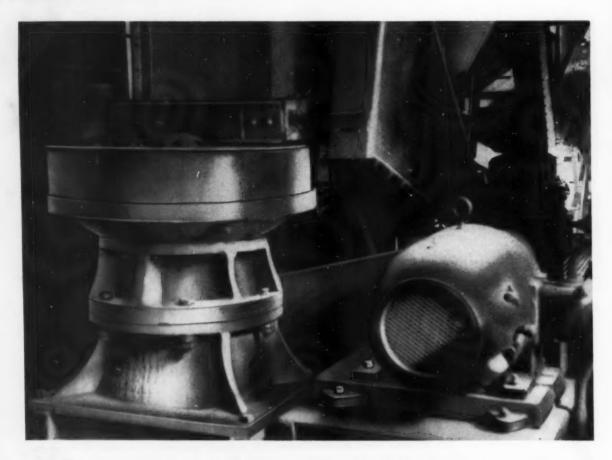
ONLY MAKES
SELENIUM NEOPRENE ARMORED TIDEY

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

APRIL 1955

[World Mining Section-19]

1



It Pays to Put Secondary Reduction First

Secondary crushers should receive prime consideration when setting up new ore processing plants.

In many ways, secondary crushing is more important to profitable ore production than the primary reduction of the raw material. A uniform, cubical size product from the secondary crusher assures more efficient processing throughout the remaining stages of ore refinement.

Traylor TY Crushers offer the uniform production provided by Traylor's original curved crushing surfaces. Curved concaves and bell heads, developed by Traylor to meet rugged production requirements, have been proved in hundreds of installations.

They are fully described in Traylor Bulletin #7112. Write for your copy today and see why a "Traylor-Made" secondary crusher is of primary importance to profitable ore production.

TRAYLOR ENGINEERING & MFG. CO. 733 Mill St., Allentown, Pa.

an Mfrs.: Canadian Vickers, Ltd., Montreal, P.





SEND FOR BULLETINS . just mention the Traylor Equipment that interests you.

NEW YORK . CHICAGO SALES OFFICES

[World Mining Section-20]

SAN FRANCISCO

MINING WORLD

Floating Lead-Zinc Ores in French Morocco



SUCCESSFULLY treating Lead-Zinc Ores (both Sulphide and Oxide circuits) in faraway French Morocco typifies the world-wide service of Agitair in all fields of beneficiation. Agitair Flotation everywhere adapts to the most challenging requirements for dependable, low-cost mill operation. Each applica-

tion is pre-tested by experienced Galigher engineers, who have every skill and pilot plant facility for developing the flow sheet.

Field exploration, ore testing, mill design and initial supervision are all a part of the famed Galigher service. Write today for the details. Request free literature on Agitair.

Other **Galigher Products**

Horizontal VACSEAL Pump Vertical VACSEAL Pump Laboratory AGITAIR Acid-proof Sump Pumps Laboratory Ball Mills Geary-Jennings Sampler Geary Reagent Feeder Laboratory Pressure Filters Leaders in Experience and Service

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[World Mining Section-21]



... and they are made and backed by CLEVELAND Rock Drill

How do Cleveland CRD one-use bits save you money? It's just plain economics. You see, the price of CRD bits on an average, is less than one-half that of a multiuse bit. In fact, the price of a CRD bit comes close to matching the cost of reconditioning a multi-use bit.

So the price alone of CRD one-use bits can help you cut your drilling costs. But there are other reasons to use CRD bits, too.

Foster Drilling Speed — Special offset gauge feature, which permits the use of thinner wings and a steeper reaming angle, greatly reduces binding and provides ample clearance for cuttings. Result is a free, fast-cutting, chiseling action that gives you greater drilling speed.

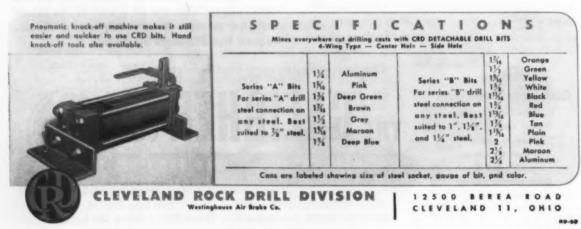
Less Drill-Steel Breakage — The method of attachment used with the CRD bit eliminates threads on the drill rod. Since a drill rod is only as strong as the root

diameters of its threads, the tapered threadless CRD design provides longer drill-steel life — reduces drill-steel handling and reconditioning costs.

Lower Rock Drill Repair Costs — Because the CRD bit design reduces binding in the hole, there is less strain on the rotation parts of your rock drills. Rifle bars, rifle nuts, and chucks last longer. You get more drilling done at lower cost.

Since no special equipment is needed for reconditioning bits or threading rods, you owe it to yourself to try a can of CRD bits. They're ideal for roof bolting and for use in your stopes as well as in your headings. A short trial will give you first-hand information on the ability of these bits to cut drilling costs in your property, as they have in so many others.

Bulletin RD-29 gives detailed information. A copy is yours for the asking — just write for it.





The drive on this huge jaw crusher was changed to Gates Vulco Ropes 12 years ago. 35 million tons of ore were crushed before the belts were replaced. The trouble-free performance of these Gates Vulco Ropes made it certain that the replacement belts would also be Vulco Ropes.





Plants all over the world have made this discovery: Gates Vulco Ropes-the V-belts with concave sides-wear longer; cost less per year of service.



Here is the interesting reason why:

When the Gates Vulco Rope is bent around the sheave, the precisely engineered concave

sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes full, uniform contact with the sides of the pulley. You get sure pulling power and even distribution of wear.

Longer wear saves not only on replacement costs; it also saves the cost of down-time... keeps equipment producing.



It's easy to prove to yourself the value of concave sides



costs.

Simply bend a straight-sided belt (Fig. 2) and feel the bulge at the sides around the bend. You will quickly see why the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact shortens belt life...increases belt

Cut belt replacement time and costs...specify Gates Vulco Ropes-the V-Belt with concave sides (U.S. Pat. 1813698). The Gates Rubber Co., Denver, Colorado-World's Largest Maker of V-Belts.

> Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

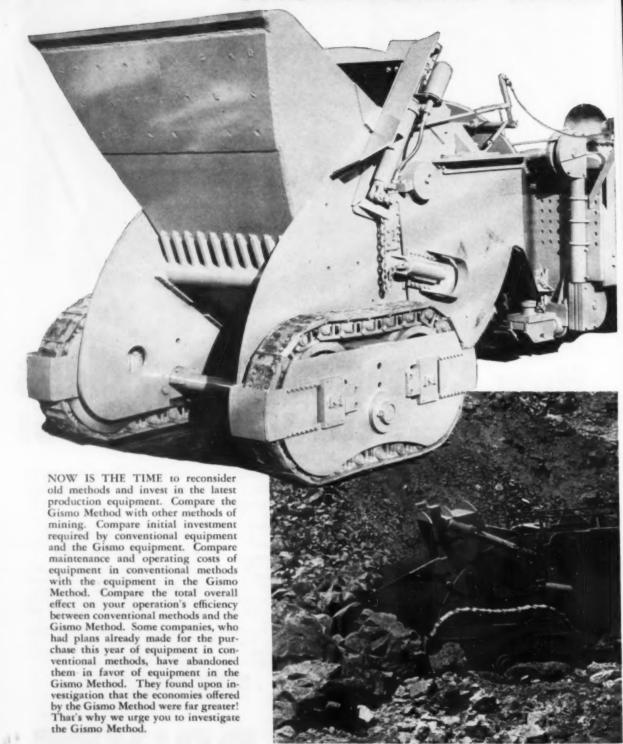
TPA-30-8

GATES



DRIVES

SHOWDOWN WITH



THE GISMO does not load by momentum or crashfashion. Shovel head is eased into muck pile (see photo at right) as simply as a hand shovel into sand. The Gismo loads regardless how thick the muck may be.

MINING COSTS: Gismo Method promises big new economies

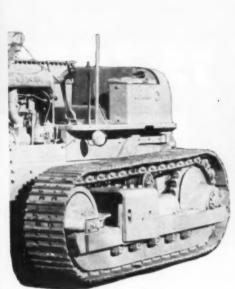




Photo above, taken from operator's seat on tractor, shows how the GISMO is operated under his complete control with clear view of shovel.

THE GISMO MAKES POSSIBLE a mining method requiring few machines, few men, less planning and integration. It permits total mechanization of your mine—the solution to present economic conditions of high man-hour and materials cost.

How does it do it? By offering you a general purpose utility self-loading transport (the GISMO) that is simple, versatile and built to take the punishment of rock excavation. It is well suited to almost all mining conditions. No special development facilities or conditions are usually required. It operates in sloping ore bodies with irregular outlines, as well as large or relatively small openings. It is easily maneuverable at maximum or minimum speed of the equipment.

With perhaps a few exceptions, the GISMO can be taken into any mine . . . disassembled easily and quickly if necessary.

Its versatility meets every requirement. It loads (mucks) in development or production... transports... drills (supports 2 to 5 jib mounted drills)... back fills... moves boulder rocks... makes its own roadways and cleans up completely.

The GISMO is an efficient machine that can load and transport up to 100 tons per hour with a 300 ft. haul . . . drill at rate of 400 ft. per man shift . . . is an extremely simple piece of equipment built for rough work and requiring little maintenance. Its initial cost can be reasonable compared with one year's maintenance cost alone of much of the conventional equipment in present use. Without question, the extraordinary economies the Gismo Method promises merit thorough investigation by any firm excavating rock or its equivalent. Ask us for complete information. Sanford-Day Iron Works, Inc., P. O. Box 1511 . . . Telephone 3-4191, Knoxville, Tennessee.

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MINE CARS, All Types - PRECISION WHEELS - "Brownio" HOISTS CAR RETARDERS - SPOTTERS PUMPS - OIL SPRAY SYSTEMS

ALLIS-CHALMERS PRESENTS TWO



Power that pays

The TS-360's great new Allis-Chalmers engine spearheads a whole new power train that offers more rim pull at lower speeds for better loading, hauling and spreading performance; faster acceleration, easy shifting and quick getaways. Combined with new 20-yd capacity, this all adds up to fast, highvolume, high-profit work cycles.

New operating ease and safety In addition to big-job power and gearing, the TS-360 Motor Scraper offers everything an operator needs to work easily, yet efficiently . . . new Double-

Safety air brakes, new selective steering, direct electric starting, new multiple-disc cable control . . . and many others you'll want to know more about.

Strength to back it up!

The new TS-360 is built around a new, all-welded, heavy steel main frame that makes possible the service accessibility of unit construction. What's more, there's an all-new final-drive gear train,

with new gears, shafts and bearings. These and many other advantages mean more work done, lower maintenance cost and longer equipment life.

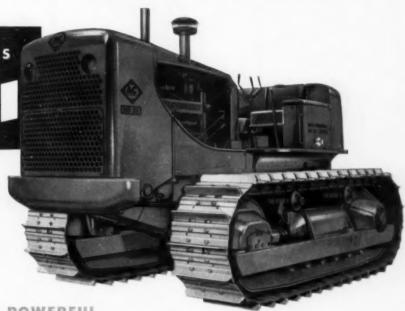
Nowhere can you match these two in the amount of work they do!

.. for more power-better performance-longer life . . .

NEW, POWERFUL DIRT MOVERS

HD-2

204 NET ENGINE HP



BIGGEST, MOST POWERFUL
CRAWLER IN PRODUCTION ... ANYWHERE!

New standards of output

The HD-21 introduces the new Allis-Chalmers engine and a great new power transmission team. Together, they provide extra speed with any load, extra pulling power at any speed . . . wider speed ranges and more range overlap. And with its advanced design torque

converter (the result of 15 years of leadership by Allis-Chalmers) the HD-21 puts its power to work with less shifting than ever before possible...to help you reach a new high in efficient, profitable production!

New standards of durability

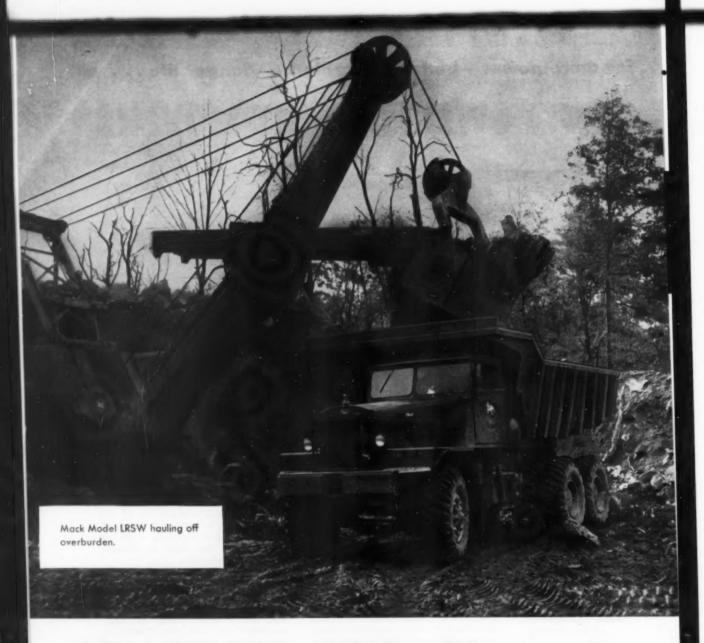
From the new Allis-Chalmers diesel with "follow-through" combustion to new, heavier Tru-Dimension track, the HD-21 is built to take today's big loads in stride, and come back for more. Here are just a few more of the long-life

features you can't get from anyone but Allis-Chalmers...at any price: allsteel Box-A main frame, straddlemounted final-drive gears, 1,000-hour truck wheel lubrication, oil-enclosed track release mechanism.

New low cost per unit of work The HD-21 offers 20 percent greater over-all performance... provides a new measure of tractor value. Add the planned approach to service offered by

Allis-Chalmers dealers, and it's the ideal team for men tackling today's big jobs.

ALLIS-CHALMERS



big shovels call for big trucks

Today's big-yardage jobs demand maximum loads per haul and faster time cycles from shovel to dumping point and return. Increasing use of larger and larger shovels points to the Mack Models LRSW and LRVSW six-wheel dump trucks as the answer to these stepped-up requirements.

Here are trucks that are built to keep big shovels on the go...to give mine operators increased production per driver and per truck dollar invested.

These Macks will move 21 to 28 yards with un-

faltering ease over the toughest terrain. No miring in with these Macks—they have the advantage of Mack's famous Balanced Bogie with exclusive Power-Divider, enabling them to pull through where other trucks bog down. In actual service these models have demonstrated their ability to maintain the time schedule of smaller-capacity dumpers.

Why not investigate the big-unit economy of Mack Models LRSW and LRVSW. It will pay you to see these big jobs at work.



Capitol Concentrates

You Can Tell Your Congressmen Why Minerals Program Needed To 1963

Congressional offices report receiving very little supporting mail for the Goldwater bill, S. 922, which would extend the government's mineral programs until 1963. This lack of response is especially amazing considering what such an extension would mean to those in the manganese, tungsten, chrome, mica, asbestos, and other mineral producing businesses. Up to this writing, tungsten producers have been about the only ones "on the ball" and they have been contacting Congressmen personally and through their association. The Manganese Producers Association has been busy backing the Mills bill, H. R. 3126, but individual operators do not seem to be active, according to congressional sources.

People interested in procuring legislation should remember the results of a survey made for the radio business some years ago. The survey indicated that individuals who are against something are just three times as active as those who are for it. Thus if the mail runs three to one against something, the public actually will be equally for and against. The ones who like something are lazy about expressing themselves; those who are mad at something jump for the pen, pencil or typewriter in a hurry. It behooves those who approve a piece of legislation to be equally forceful if they want something done.

• Stockpiles Become Price-Control Weapons

As everyone knows by now, the national stockpile purchasing mechanism has been molded gradually into such shape that it can be used to control markets and prices, thus in a way by-passing the lockup clause of Public Law 520, the Stockpile Act of 1946.

The remarkably flexible stockpile aims make it possible for the government to go into the market and sustain price levels. Also, by diverting to the market material under contract before it is formally taken into the national stockpile, market shortages can be averted. Both of these devices already have been used in a small way. Because of the high stockpile specifications, General Services Administration has difficulty in transferring some of its holdings to the stockpile and this material is available for disposal.

Now the Department of Agriculture is going into its new barter program. The first objectives, it is said, will be manganese, cobalt and mercury. The Department of Agriculture announced further that it may hold its own stockpiles, but that the materials will not be disposed of so as to "disrupt domestic markets." With this addition to the picture—(and who will define what is disruption?)—Administration

economists will have an economic price-control weapon of great importance ready forged and at hand.

• Mineral Bills Need One Amendment

Both the Mills bill (H. R. 3126), which would extend and amplify the government's manganese program, and the Engle bill (H. R. 3898), which would extend and amplify all the government's mineral purchase programs, seem to be deficient in one respect. They freeze the prices to be paid at present levels.

No doubt the present prices are quite satisfactory. Also, it is well known that the Office of Defense Mobilization and the Budget Bureau are somewhat unhappy that prices are so high—and will be still more unhappy if Congress insists that the programs and the prices be continued for a further five years from present expiration dates. On the other hand, some change in economic or emergency conditions might make ODM more generous, so there seems to be no good reason to put a ceiling on prices, even if a floor is desirable.

Both bills should be amended to instruct the government to pay "not less than present prices" so that the way would remain open to increase but not decrease them.

CCC Will Handle Barter Deals

The Commodity Credit Corporation has been authorized by Ezra T. Benson, Secretary of Agriculture, to handle his department's barter program with friendly nations. This is the program whereby surplus farm products will be swapped for such strategic materials as manganese, cobalt, mercury, platinum, nickel, tin, lead, and zinc.

Under this plan, the Department of Agriculture for the first time will set up its own stockpile of strategic materials. Until now, the farm agency has swapped only for materials to be stockpiled by the Office of Defense Mobilization, or used by other government agencies in foreign economic and military programs. This type of exchange, officials said, will be continued, but a portion of the items the Department of Agriculture stores may be sold eventually on the open market.

Since July 1954, the United States has bartered or made firm commitments to trade \$135,000,000 of farm products for critical materials.

• Buy-American Margin Is Set

Secretary of Defense Charles Wilson has announced that domestic bidders will be given a six

AMERICAN ZINC, LEAD AND SMELTING COMPANY

Buyers of Zinc Concentrates Suitable for Smelting in Retort and Electrolytic Smelting Plants, also Buyers of High Grade Lead Concentrates.

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SUPERIOR, ARIZONA

percent differential over foreign concerns bidding on contracts to be awarded by the armed forces. Under an amended directive, when the low acceptable domestic bid is more than six percent higher than the low foreign bid, the award may be made to the foreign contractor.

An executive order by President Eisenhower last December permitted the secretary to set the differential at six percent to 10 percent. The President's order followed a rejection by the Army Corps of Engineers last year of two bids to supply hydroelectric generators for a project in the Pacific Northwest. The differential in the bidding at that time had been 7.5 percent and 12.5 percent.

• Bi-Partisan Committee For Lead-Zinc

A bi-partisan congressional committee of more than 20 members has been organized informally to work for relief of the domestic lead and zinc mining industry. Arrangements are being made for a series of conferences at the White House to explore remedies other than the lead-zinc stockpiling program instituted last year by President Eisenhower.

Among the members of the committee are Arizona's two representatives Republican John J. Rhodes and Democrat Stewart Udall.

Republicans on the committee include: Dawson of Utah, who was named chairman of the group; Hill and Chenoweth of Colorado; Fjare of Montana; Thompson, Wyoming; Dixon, Utah; Budge, Idaho; Miller, Nebraska; Withrow, Wisconsin; Simpson, Pennsylvania; Allen of Illinois; and Rhodes, Arizona.

Democrats include the following: Metcalf, Montana; Engle, California; Rogers and Aspinall of Colorado; Rogers, Texas; Dempsey and Fernandez, both of New Mexico; Pfost, Idaho; Edmondson, Oklahoma; and Udall, Arizona.

Domestic production, according to Congressman Dawson, will not be able to meet foreign competition without additional tariff protection. The stockpilling program, he continued, has failed in its objective because low-cost imports were dumped on United States markets; therefore, extreme measures are now necessary to revive the industry in addition to protection from low-cost imports.

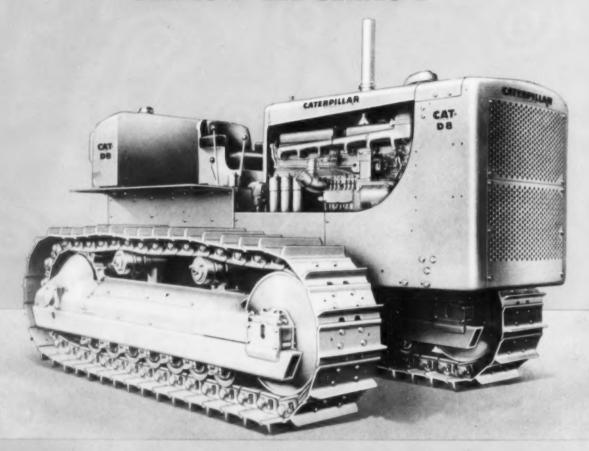
Although committee members made no formal statements, they indicated they would press for a plan to tie the lead-zinc industry into a defense program that would more fully support the industry.

COMING CONVENTIONS

- April 19 through 21, 1955, Annual meeting CANADIAN INSTI-TUTE OF MINING AND METALLURGY, Royal York Hotel, Toronto, Ontario, Canada.
- April 27, 28, 29, 1955. First joint meeting of the AMERICAN ZINC INSTITUTE and the LEAD INDUSTRIES ASSOCIATION. April 27 will be devoted to Lead Industries with a joint session the morning of the 28th. The afternoon of the 28th and all day the 29th will be devoted to the Zinc Institute's activities. Drake Hotel, Chicago, Illinois.
- May 6, 7, and 8, 1955. Second annual URANIUM ORE PRO-DUCERS EXPOSITION AND EQUIPMENT SHOW, Grand Junction, Colorado.
- May 13, 14, and 15, 1955. Ninth annual meeting and field trip NEW MEXICO GEOLOGICAL SOCIETY, Gallup, New Mexico, with field trips to Grants-Laguna uranium district.
- May 19, 20, 1955. Thirty-first annual LAKE SUPERIOR MINES BAFETY COUNCIL, Hotel Duluth, Duluth, Minnesota.
- June 20 to July 3, 1955. Centenary Congress of the SOCIETE de L'INDUSTRIE MINERALE, Paris, France. Special sessions on mining, mineral discovery, and visits to French mining and metallurgical operations.

CATERPILLAR ANNOUNCES THE RELAY D8

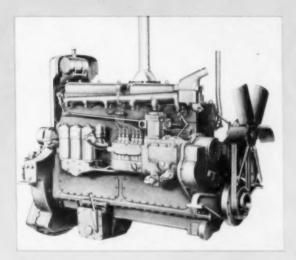
SERIES D and SERIES E



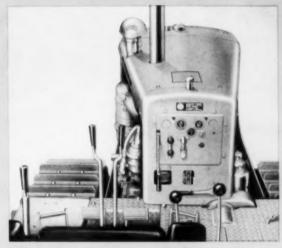
Choice of TORQUE CONVERTER or DIRECT DRIVE

You're looking at a major advance in tractor design—the new Caterpiliar D8 Tractor. While it still bears the name of the unit that earned world-wide recognition as "boss of the crawlers," it is basically a new machine with 155 HP at the drawbar and your choice of torque converter (Series D) or direct drive (Series E). From its new 7-roller track frame to its new 191-HP, 1200-r.p.m. engine, it is built to deliver an even higher standard of money-making

production on any track-type tractor application in any field. Along with its advance-design features, it retains such outstanding Caterpillar exclusives as the oil clutch and certain other jobproved developments. As a result, you can figure on it for more work at lower cost with less down time on any job. For complete information about the new, heavy-duty D8 Series D and Series E, see your nearby Caterpillar Dealer.



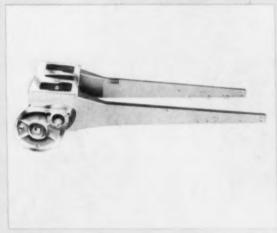
NEW ENGINE, with new fuel injection system incorporating capsule-type injection valves. Flanged center main bearing to take crank-shaft thrust. "Hi-Electro" hardened timing gear integral with crankshaft.



NEW EASY-WORKING CONTROLS handy to comfortable, one-man seat. The new streamlined hood affords greater visibility. The new easy-to-see instrument panel is attached direct to engine.



NEW "LIVE SHAFT" DRIVE, independent of flywheel clutch. This important new feature provides constant power for rear-mounted cable controls or other equipment.



NEW WELDED ONE-PIECE STEERING CLUTCH CASE main frame assembly for a stronger "backbone." Transmission and steering clutches can be removed without disturbing other parts.

NEW OPTIONAL DRIVE, torque converter or direct drive, whichever is best for your job. Torque converter: torque multiplication of 5 to 1 gives smooth operation in each speed range. 3 ferward and 3 reverse: low 0 to 3.6 m.p.h.; intermediate 0 to 5.3 m.p.h.; high 0 to 7.4 m.p.h. Direct drive: 5 speeds forward and 3 reverse.

NEW 7-ROLLER TRACK FRAME for grouter stability, flotation and better ride.

NEW "WATER-QUENCHED" TRACK SHOES for longer life

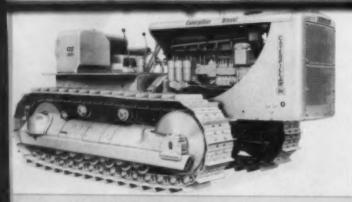
NEW HYDRAULIC BOOSTER STEERING, pump drive direct from engine, independent of flywheel clutch, for maximum steering ease.

NEW STARTING ENGINE with more power for faster, surer starts in any weather.

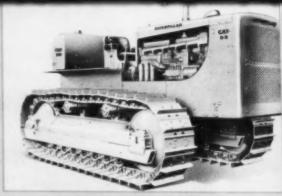
NEW "IN-SEAT" STARTING for greater convenience.

NEW 118-GALLON FUEL TANK, enough for normal 12-hour operation.

NEW ATTACHMENTS include cable controls—the new rearmounted double drum No. 29 with constant power drive direct from engine, and the new front single drum No. 30. New, larger No. 8A and No. 85 Buildozers, both cable and hydraulic controlled, are also available. The new No. 8U "U"-blade 'dozer has extra strength. Cable-controlled dozers use a 6-part line for greater lifting power. All equipment used on the DB can be used on the new DB Series D and Series E.



The DB



The NEW DB Series D and Series E

CHECK THE DIFFERENCE ADVANCE DESIGN MAKES BETWEEN THE D8 AND THE NEW D8 Series D and Series E

	DB	DB Series D with torque converter	DB Series E with direct drive	
Operating Weight	38,155 lb.	41,265 lb.	40,430 lb.	
Ground Clearance	101/2 in.	13 in.	13 in.	
No. Track Rollers	6	7	7	
No. Track Shoes	39	42	42	
Length of Track on Ground	99% in.	111% in.	111% in.	
Area Ground Contact 22-in. Shoe	4389 sq. in.	4917 sq. in.	4917 sq. in.	
Fuel Tank Capacity	98 gal.	118 gal.	118 gal.	
Drawbar	Swinging	Fixed	Fixed	
Drawbar Pin Size	1 % in. dia.	2¼ in. dia.	2¼ in. dia.	
Steering Clutch	Over center spring booster	Hydraulic booster	Hydraulic booster	
Steering Clutch Case	Cast iron. Integral with transmission case.	Steel fabricated. Separate from transmission case.	Steel fabricated. Separate from transmission case.	
Transmission Case	Cast iron. Integral with steering clutch case.	Cast iron barrel. Separate from steering clutch case.	Cast iron barrel. Separate from steering clutch case	
Main Frame	Box section bolted to cast case.	Box section welded to steel case.	Box section welded to steel case.	

Production-wise and profit-wise, you have a new yardstick of performance in the CAT* D8 Series D and Series E. Your Caterpillar Dealer, source of prompt service, will be glad to show you how this rugged new yellow machine can pay off for you!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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CATERPILLAR LEADERSHIP

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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

April 1955

INTERNATIONAL PANORAMA-

CARLSBAD, NEW MEXICO-National Potash Company has been formed here by Freeport Sulphur Company and Pittsburgh Consolidation Coal Company to develop a potash mine and build a refinery. Expected capacity will be 250,000 annual tons of K2O.

ROCKDALE, TEXAS-The Aluminum Company of America is expanding its aluminum smelting facilities here and at Port Comfort by 65,000 annual tons. Output in the United States in 1954 was 1,460,565

MOSCOW, RUSSIA—The Russian iron and steel industry made record outputs in 1954. Pig iron production was up to 30,000,000 tons from 27,500,000 in 1953; steel 40,800,000 up from 37,800,000; and rolled steel 32,200,000 up from 29,500,000.

BELL BAY, TASMANIA-Australia's first aluminum plant has started operations. The plant has a capacity of 10,000 annual tons of aluminum

RUTH, NEVADA-Kennecott Copper Corporation's Nevada Mines Division has discovered a 1,000,000-ton ore body assaying 1.175 percent copper. The near surface non-outcropping deposit will be mined by block caving as the first phase of the Deep Ruth Project.

CERRO de PASCO, PERU-High-grade uranium has been found in the Colquirjirca mine of the Fernandini interests. Extent of the mineralization is being determined.

TOKYO, JAPAN-Primary aluminum production reached a record post war high of 53,111 metric tons in 1954. Output in 1953 was 45,494 tons.

STARKE, FLORIDA—National Lead Company has purchased 6,816 acres of ilmenite-bearing land in Duval, Baker, Bradford, and Clay counties. The area is near the Trail Ridge and Highland ilmenite mines of Humphreys Gold Corporation and Dupont Company.

BLIND RIVER, ONTARIO, CANADA—The New Jersey Zinc Company and the Texas Company through their joint uranium venture agreement have started uranium exploration here. Subsidiary companies are doing actual work

SANTIAGO, CHILE-The Anaconda Copper Mining Company will start copper production at its Africana mine near here. Annual output is expected to be 20,000 tons of copper concentrate.

JOHANNESBURG, UNION OF SOUTH AFRICA-A new world record for sinking a shaft by hand mucking has been set by Vaal Reefs Exploration and Mining Company Ltd. In January the 18-foot diameter circular ventilation shaft was sunk 590 feet.

CUTTER, ARIZONA-The United States Atomic Energy Commission will open a uranium ore buying station here to buy quartzite-bearing uranium ore from the Sierra Anchas district.

KALGOORLIE, WESTERN AUSTRALIA-Deep diamond drilling south of the main gold mines has yielded encouraging results. Kalgoorlie Southern Gold Mines, N. L. has found mineralized quartz veins at depths between 2,883 and 3,035 feet.

BARSTOW, CALIFORNIA-During the first two months of 1955 more than 1,300 mining claims, mostly for rare earths, have been filed in San Bernadino County.

BARRAUTE, QUEBEC, CANADA-Quebec Lithium Corporation has plans to start immediate construction on a 1,000-ton-per-day spodumene flotation plant here.

CROCKERS WELL, AUSTRALIA—A promising uranium discovery is to be drilled at Jagged Rocks by the South Australian government.

GLOBE, ARIZONA -- An indication of the uranium boom in Gila County, Arizona in 1954 is indicated by the fact that 5,760 mining claims were filed in the county-mostly for uranium.

U & I Joins Odlum Firm In Uranium Consolidation

Additional mergers involving the re-organized Federal Uranium Corporation organized Federal Uranium Corporation have been announced by the Floyd B. Odlum-backed firm. U & I Uranium Corporation, Kellogg, Idaho, owned by six Idaho companies, and the Fourteen Group, Inc., Albuquerque, New Mexico, are the latest entrants in the Federal merger. Estimated value of the Radon claims in the Big Indian district, San Juan County, Utah, in which U & I and the New Mexico group each hold a 50

the New Mexico group each hold a 50 percent interest, is \$20,000,000.

With the merger, Federal inherits a contract involving the Hecla Mining Company to mine the Radon ore on a profit-sharing basis and to drill adjoining holdings. It is presumed that the Hecla contract will be extended to include a number of other properties re-cently acquired by Federal.

cently acquired by Federal.

Federal officials reportedly also have been negotiating with representatives of M. K. Ruddock, Moab, Utah, who controls Cal Uranium, Inc. and Almar Minerals. Mr. Ruddock's firm holds claims on each side of U & I's Radon group. Merger of Federal with Almar Minerals could open up a continuous mining program in the vicinity of U & I's holdings in the Big Indian district.

Radioactive Ground Survey Set for Cape Province

The South African Atomic Energy Board's geological survey unit has sched-uled a ground survey for radioactive minerals over an extensive area in the Kenhardt and Namaqualand districts of the northwestern Cape Province. If the preliminary operations prove favorable,

additional aerial surveys are planned.
Uranium profits from South African
gold mines for 1954 have been reported
at £8,105,744, compared with the 1953 figure of £1,828,067

ASARCO Will Reopen New Mexican Units

The American Smelting and Refining Company is making plans for the imme Company is making plans for the immediate reopening of its Ground Hog unit at Vanadium, in Grant County, New Mexico. This zinc-lead property has been shut down for two years because of the low prices for these metals, and is only able to resume production by a severe curtailment of development work.

ASARCO's Deming Milling Unit will also be reopened after a stockpile of ore is available for treatment. W. C. Waidler is superintendent of both units.

O'okiep Copper - A Special Report in May



SOME OF THE WORLD'S MOST ADVANCE CLASSIFICA-TION practices are featured in American Chrome Company's 1,000 ton per day mill at Nye, Montana. Grinding, classification

and tabling sections are in the large building in the central portion. The secondary crusher building, fed by the aerial tram line breaking over hill at top left, is just to left.

Redesigned Classifiers Iron Out Tough Chromite Separation Problem

In this day and age of flotation one seldom hears anything of hindered settling classification and only limited application of gravity concentration. That's what makes the American Chrome Company's operation in the Beartooth Mountains, 80 miles southeast of Columbus, Montana so unique. They have performed a marriage of these two processes to upgrade the ore mined at the Mouat mine-the nation's largest chromite operation. The union has paid off by drastically reducing operating costs while maintaining a high recovery of mineral in a simple milling circuit.

Some of the most advanced classification practices in the world have been developed to feed the battery of tables installed in the concentrator. Primary reason: Only a slight specific gravity difference exists between chromite and gangue. To produce a suitable concentrate with a low tailing loss required close control of product sizes fed to the tables.

The American Chrome staff redesigned and built a hindered settling classifier which handles the problem successfully. The unit has ironed out feed rate fluctuations and reduced operator supervision at the mill. The metallurgical results speak for themselves. American Chrome is producing a 38 to 39 percent concentrate from an ore mineral containing only 36 to 46 percent Cr₂O₃ in its pure state.

CAMBINATE AD EPINATOR PERD SHOWN TO THROUGH CLASSIFIER SHOWING POCKET DETAILS AMONG DISCHARGE CROSS-SECTION THROUGH CLASSIFIER SHOWING POCKET DETAILS AMORTICAL POCKET DETAILS

Overall recovery is approaching 84 percent.

Property Re-equipped

Anaconda Copper Mining Company as agent for the government operated the Mouat mine and mill for a brief period during World War II as an emergency measure. When foreign supplies of chromite eased later in the conflict, the high cost operation was shut down. The mine and mill were completely stripped. In 1952 American Chrome Company, subsidiary of Goldfield Consolidated Mines Company, acquired a long term lease on the property, and negotiated a stockpiling contract with the federal government which provided for the delivery of 900,000 tons of chrome concentrate over an eight-year period.

The mine was reopened, and the Riblet Tramway Company of Spokane, Washington installed a 1½-mile aerial tramway for mine to mill ore transport. Western-Knapp Engineering Company finished renovating and reequipping the skeleton mill building in the latter part of 1953. The year 1954 witnessed the attainment of full productive capacity of 380 tons of

chromite concentrate per day from the 1,000 tons of feed routed through the mill.

Why Classification Required

The heart of the mill is the classifier section which feeds the tables. The core of the milling problem lies in providing a well classified feed, and a steady feed devoid of surges and abrupt changes in characteristics. The reason behind this: chromite has a specific gravity which varies be-tween 4.1 to 4.4. The gangue made up largely of olivine and bronzite has a density ranging from 3.1 to 3.5. Since the difference in unit-weight between ore and gangue is so narrow, close control of product sizing is necessary for optimum recovery by tabling. This necessity was emphasized in the early stages of the operation when the company had to train mill operators. Few men with experience in gravity concentration exist today. If the tables can be operated with a minimum of change in feed characteristics, few adjustments in slope, throw and water added to a table are nec-

Several Classifiers Tried

Two types of classifier were tested in the circuit, both with unfavorable results. They failed to meet one or other of the primary requirements. One type, lacking adequate capacity and automatic features didn't produce a well-sized feed.

A second classifier (a deep pocket unit) was tried. The spigot products Why American Chrome Chose Gravity Concentration To Upgrade Chromite Ore

Four distinct factors swung the decision in favor of tables rather than using flotation to concentrate the ore mined at Mouat. The old mill, constructed during the war utilized gravity concentration. Although the facilities and most of the equipment in the building were stripped when chromite from foreign sources again became available, the structure and layout of the building foundations lent itself to the installation of classifiers and tables without extensive redesign.

Since the chromite concentrate is going to the government stockpile, it was felt that it would be easier to store a coarse product rather than a fine, flotation concentrate. Less storage area would be required and dusting losses would be held to a minimum.

The mill man's theoretical Utopia is attained when concentration begins as the ore mineral is unlocked from the gangue. This eliminates unnecessary grinding which is widely known to be an inefficient process and a high consumer of power. Test work divulged that the bulk of the chromite occurred in a coarse form in the ore. The ore mineral is liberated at a size too coarse for flotation, so a gravity process seemed more practical. It is interesting to note in this connection, that approximately 80 percent of the chromite is recovered in the primary coarse tabling operation before any middling is retreated.

The final and probably clinching argument for a gravity process—the capital cost for re-equipping the mill with classifiers and tables was much less than the outlay required for a flotation plant. Approximately 50 percent of the ore is composed of the chromite mineral. The concentrate produced by the mill represents about 40 percent of the mill feed. To plan a flotation installation to handle this high proportion of ore to gangue would require many machines. It is doubtful that any improvement in recovery by flotation would offset the increased plant investment required. In addition, it is debatable whether flotation would better the present recovery which is now approaching 84 per cent.

were well sized, but a surging table feed resulted. The density of the sorting column in each pocket was maintained at a pre-determined amount by automatically controlling the spigot discharge rate. A float controlled valve, actuated by density variations, changed the width of the spigot opening to maintain control over settling conditions.

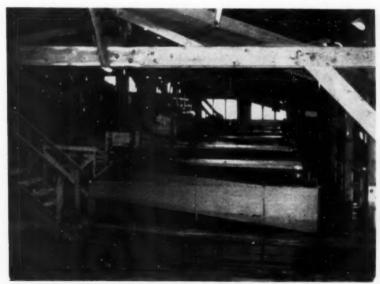
Reversing Automation Process

Finally the staff came up with the idea of reversing the controls used in the latter machine; that is, maintaining the sorting column at the specified density by automatically controlling the rate of water addition in the sorting column. The density of the teeter column would control the valve on the water inlet line. Variations in density would admit more water or less water to compensate for the change from normal. The spigot discharge was then set to open automatically 40 times per minute.

Through this reverse-principle, company officials have been able to maintain a constant feed rate at the tables. They have also been able to produce a well-sized product while exercising good control over settling conditions. How well they have succeeded can be attested by the improved recovery of the chromite mineral on the coarse sand tables on the first deck.

Eight Pocket Units

The classifiers now in use are hindered settling devices which automatically control the velocity of an upward flow of water through a bot-



WELL CLASSIFIED and closely sized spigot product of each pocket in classifier feeds a separate Wilfley 6A table. Experienced table operators are hard to find these days, but the controlled feed system cut down on supervision required.



RUGGED TERRAIN makes ore transport to the mill over this continuous bicable transway cheaper than truck haulage.

tom constriction plate to produce the desired sorting conditions. The unit is approximately 20 feet long by 5 feet deep. Its length is divided into eight deep pockets, each pocket containing two discharge spigots. At the first pocket, where the pulp is introduced, the classifier is 1-foot wide, but it widens to 3 feet at the final pocket. This gives a bottom area of approximately 200 square inches at the feed end which increases to a maximum of

1,000 square inches in pocket No. 8. The coarse and heavy particles settle to the spigot in the bottom, while the fine and less dense solids overflow a weir to the next pocket.

The particles that penetrate the teeter column are discharged through a valve which is automatically opened 40 times per minute. It is true that this produces a rapid surging discharge for the tables, but it has been found that by the time this product is laundered to a table the surge has been effectively flattened out. Close control of sizing is attained since each spigot in a pocket feeds a table. This means that tables can be adjusted to give optimum metallurgical results without resorting to undue supervision or frequently changing the slope or water addition.

Upward Flow Classifies

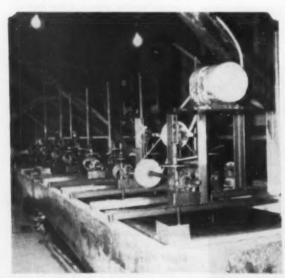
Control of hindered settling characteristics in each individual pocket is maintained automatically through a pressure control, motor and valve mechanism. Each compartment or pocket is fitted with a false bottom, known as the constriction plate. Water admitted through the automatic valving system enters the bottom of each pocket below the constriction plate. The upward velocity of the fluid through the constriction plate controls the size range of the particles held in teeter. Hole sizes in the constriction plate of each pocket become progressively smaller. In pocket No. 1 where feed is introduced, the constriction plate is drilled with larger holes which, in effect, permits the water to escape to the pocket at a relatively high velocity. The effect of this is to permit only the coarser particles to settle out, while intermediate sizes are held in suspension and eventually overflow a weir to pocket No. 2. The second pocket being larger and containing a constriction plate with slightly smaller holes, has a slower stream of water rising in its column. Smaller and less dense particles will settle to the discharge outlet. The fine material overflows to pocket No. 3. The same classification process takes place throughout the remaining five pockets of the unit.

Control

Density of the teeter column is maintained at about 40 percent solids to give optimum settling results. A density tube inserted from the top of each pocket of the classifier actuates a motorized valve. Should the density change, the motorized inlet valve controlling input of water below the constriction plate is either opened or closed to compensate for the density change.

Spigot Discharge

Discharge valves on the spigot are opened simply and automatically 40 times a minute by a simple mechanical device, illustrated in the cross-sectional drawing. The valve is connected to a rod extending above the top of the classifier. Across the top of the vertical rod, a horizontal plate is mounted. A rotating shaft extending the full length of the classifier contains a number of eccentric mounted cams. These cams when bearing



TOP VIEW of one of the hydraulic, hindered-settling classifiers which closely size table feed. Notice the drive and shaft arrangement which control the discharge valves.



DENSITY OF SORTING COLUMN in each pocket regulates the flow of classifying water admitted through the use of Minneapolis-Honeywell pressure control and motorized valving.

Flowsheet of American Chrome Company's 1.000 Ton Gravity Concentrator

Nye, Montana

Legend

CRUSHING AND GRINDING

- Riblet aerial tram from coarse crushing plant at mine.
- Secondary crushing bins, 1,500 ton capacity.
- Traveling draw-off apron feeder.

- 5. Traveling draw-on apron feeder.
 4. Belt conveyor, 24-inch.
 5. Tyrock, 4 by 8 foot vibrating screen, % by 5 inch slot openings.
 6. Symons 4%-foot standard cone crusher set at %-inch.

- set at %-inch.
 7. Belt conveyor, 24-inch.
 8. Fine ore bins, 1,500 ton capacity.
 9. Two traveling Feedoweight feeders.
 10. Four 20-inch belt conveyor.
 11. Two Denver rod mills, 6 by 12 feet.
 12. Two bucket elevators.
 13. Eight 4 by 5 foot Hummer screens, four in each circuit.

CLASSIFICATION

- 14. Two 12-foot Wemco hydroseparators.
- Two locally designed, 16 spigot hydraulic classifiers, one in each sec-

COARSE CIRCUIT

16. Thirty-two Wilfley 6A tables.

MIDDLING CIRCUIT

- 17. Three-compartment sump.18. Eight Hydroseal AB sand pumps. Six
- in service, two standbys.

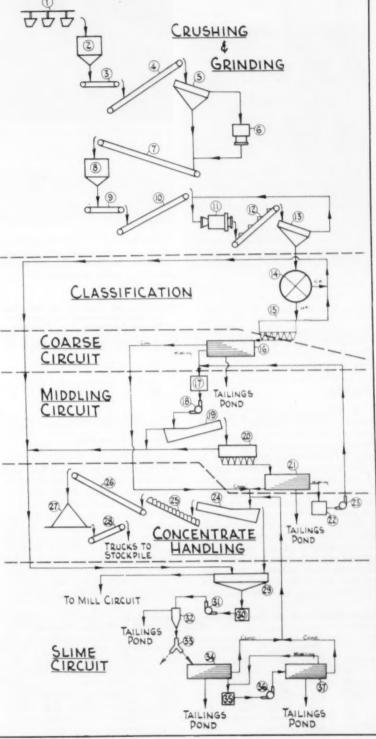
 19. Wemco dewatering classifier.
- 20. One locally designed 15 spigot bydraulic classifier. 21. Fifteen Wilfley 6A tables.

CONCENTRATE HANDLING

- 22. Two-compartment sump.23. Two Hydroseal sand pumps. One in service, one standby.24. Two Wemco dewatering classifiers.
- 25. Screw conveyor.
- 26. Stockpiling belt conveyor, 20 inches.
- 27. Three temporary stockpiles.28. Hough Payloader.

SLIME CIRCUIT

- 29. Three Dorr thickners.
- 30, Sump.
- 31. One Hydroseal AB sand pump.
- 32. One six-inch DorrClone.
- 33. Splitter.
- 34. Fourteen Wilfley 6A tables.
- 35. Two-compartment sump.
 36. Two Hydroseal AB sand pumps, one standby. 37. Seven Wilfley 6A tables.



Typical Screen Analysis of Overflow from Hydraulic Classifier, American Chrome Company, Nye, Montana

Mesh	Percent Held	Cumulative Percen
20		Million
35		
48	0.28	200.000
65	0.28	0.56
100	4.96	5.52
200	43.80	49.32
-200	50.69	100.01

against the plates raise and lower the valve from its seat in the discharge line.

Aerial Tramway

The 1,000 tons of ore mined daily is reduced to 3 inches in size at the mine crushing plant. At this station, a Universal 24-by-36-inch jaw crusher is fed with oversize from a Simplicity 3-by-8-foot scalping screen with a rail type deck. Screen undersize and crushed ore are transported 416 feet over a 24-inch conveyor belt to the bins at the tramway loading point.

A 1%-mile aerial tram considerably shortens the 5-mile distance, by road, separating the mine and mill. As a matter of fact, the company finds it more convenient to maintain separate camps and facilities at the mine and mill. The continuous bi-cable aerial tram accommodates forty, 14-cubic-foot buckets which gives the installation an approximately 90-ton-anhour capacity.

Crushing

At the mill, the buckets are unlocked from the tramway and the contents dumped in one of seven secondary crusher bins. The total capacity of the secondary crusher bins is 1,500 tons or about 1% days supply of ore. Shephens-Adamson traveling apron feeders draw the feed from these bins and discharge to a gathering conveyor. The ore is conveyed to a Tyrock 4- by 8-foot, single-deck screen with 1/2- by 5-inch slots. The oversize scalped off is crushed in a Symons 44-foot cone crusher. The discharge and undersize from the scalping screen are picked up by a 552-foot conveyor, weighed by a Fair-



WILLIAM HISLE, better known as Bill, is mill superintendent at American Chrome's Montana operation.

banks-Morse belt scale and distributed among the mill bins by a Link-Belt trip conveyor.

Grinding

The flow of ore in the grinding section, including allied screening and classifying facilities, plus the coarse tabling operation, is divided into two identical circuits.

Typical Screen Analysis of Underflow from Hydroseparator* at American Chrome Company, Nye, Montana

Mesh	Percent Held	Cumulative Percent
on 20	1.2	1.2
35	20.8	22.0
48	15.5	37.5
65	15.0	52.5
100	13.5	66.0
200	17.5	83.5
-200	16.5	100.0

This forms the feed to the hydraulic, hindered settling classifiers which classify the initial primary coarse table feed.

Two traveling Merrick Feedoweights draw from the mill bins and feed two rod mills, each operating in an identical parallel circuit. The rod mills are 6 by 12 feet and are charged with 3-inch rods. The discharge from each mill is elevated by two bucket elevators, consisting of a 20-inch belt and 8- by 18- by 8½-inch buckets spaced 18 inches apart. Eight 4- by 5-foot Hummer vibrating screens (four in each circuit), fitted with stainless steel decks, scalp off the plus-20-mesh

Typical Metallurgical Results at American Chrome Company, Nye, Montana

Tons milled per operating day	1009.4
Tons concentrate produced per operating day	392.0
Head (percent CR2 O3)	19.78
Concentrate (percent Ca: Oz)	38.94
Ratio of concentration	2.59 to 1.0
Recovery (percent)	79.0
Rod consumption (pounds per ton)	1.28
Tons milled per man shift	26 to 27

feed which is returned to the grinding section.

Classification

Undersize from the four screens in each circuit flows to two, 12-footdiameter Western Machinery Company hydroseparators. The overflow, containing 90 percent minus-200-mesh, is pumped to thickeners serving the slime plant; the underflow feeds the two locally designed and built hydraulic classifiers which size the table feed in the primary section. The 16 spigot products produced by each classifier are treated on 16 tables in each circuit. The finished concentrates are stockpiled while the middlings produced by these tables are collected for retreatment; the primary coarse tables make a finished tailing also. All the tables in the mill are Wilfley 6A shaking tables.

Middling Treatment

The middling product produced by each table in the two circuits is collected in a three-compartment sump; here two pump circuits each utilizing two Allen-Sherman-Hoff Hydroseal pumps operating in series, elevate the product back to a de-watering classifier. Pulp overflowing the de-watering classifier is routed to thickeners serving the slime plant. The sands report to the hindered settling classifier for sizing of the table feed to the middling section.

This classifier is identical to those employed in the coarse tabling section with the exception that only 15 spigot products are made. The first pocket of the classifier has only one discharge. The overflow from the classifier is

(Continued on page 60)

Screen Analysis of the Classified Spigot Product in Each Pocket of American Chrome Company's Designed and Built Classifier at Nye, Montana Chrome Mill

	Pocke	t No. 1	Pocke	t No. 2	Pocke	nt No. 3	Pocket	No. 4	Pocket	No. 5	Pocket	No. 6	Pocket No	
Mesh	Held	Cumu- latice	Held	Cumu- lative	Hold	Cumu- lative	Held	Cumu- lative	Held	Cumu- lative	Held	Cumu- lative	Held	latic
20	1.54		0.31		-		inet		-		-		_	
35	54.82	56.36	35.46	35.77	20.11		7.49		1.65		0.13		Chance:	
48	31.25	87.61	35.36	71.13	37.25	57.36	31.43	38.92	16.45	18.10	3.33	3.46	0.80	
65	10.66	98.27	20.82	91.95	31.11	88.47	43.25	82.17	45.15	63.25	29.47	32.93	8.81	9.6
100	1.54	99.81	7.01	98.96	10.26	98.73	16.35	98.52	30.53	93.78	50.26	83.19	42.31	51.9
200	0.10	99.91	0.94	99.90	1.16	99.89	1.27	99.79	5.85	99.63	16.67	99.86	46.79	98.7
200	0.10	100.01	0.10	100.0	0.11	100.0	0.21	100.0	0.37	100.0	0.13	99.99	1.28	99.9



"TRAIN 1203 LOADED WITH ORE . .



TOWER RADIOS ROUTING ORDERS



"PROCEED ON TRACK 4 TO PLANT"

Coordinate Your Mining By Radio!

That is the new easy way of dispatching a train by short-wave radio at the Sherman Group of iron ore mines operated by the Oliver Iron Mining Division, a subsidiary of the United States Steel Corporation. The Sherman Group is located on the Mesabi Range two miles east of Chisholm, Minnesota, and consists of four open-pit mines and one underground mine.

Short-wave radio systems are in use at the majority of the open-pit mines in the United States, but seldom in as great a capacity as at the Sherman Group. Several years ago Oliver began experimenting with radio communication as a faster and easier means of coordinating mining operations. Since the Sherman Group is Oliver's largest producer, also the largest producer on the Mesabi Range (during 1954 5,977,917 gross tons of ore were

shipped), it was logical that the first units should be installed at this mine.

55,000 Gross Tons A Day

Haulage at the Sherman is by rail. except for the use of trucks for initial mining and clean-up operations. Most pit benches are 35 feet in height. Blast holes, 9 inches in diameter, are drilled with churn drills. Broken ore is loaded with electric shovels, having 8-cubic vard buckets, into 30- and 40-cubic yard cars. Trains are made up of either six or 10 cars pulled by a Diesel locomotive. A 1,000-horsepower-single unit locomotive pulls six cars, while a 1,500-horsepower tandem engine pulls 10. Mining is conducted on a roundthe-clock basis. Three shovels and eight trains are used, producing in the shipping season an average daily tonnage of 45,000 gross tons of ore and 10,000 tons of lean ore or waste. Shipping-grade ore is hauled to the Sherman crushing and screening plant (see accompanying drawing for location) where it is crushed and sized before being sent on its way to the blast furnaces. Lean ore is stockpiled, while

waste rock is dumped on one of several waste dumps.

Selective Mining is Done

Each year the grades of ore being shipped to the blast furnaces have had to meet closer specifications. In order to meet these specifications, very closely controlled selective mining is being done at the Sherman, as well as at other iron mines. At 11:00 a. m. each day, all of the mine superintendents from Oliver's mines located in the Hibbing-Chisholm district meet with the ore grader in Hibbing, Minnesota. The ore grader has a list of the amount of each grade of ore he would like mined that day. This list is based on requirements of the blast furnaces. The different grades of ore, depending on the Fe, Mn, P, Al and Si content, as well as the size (coarse, minus-6-inches, plus-4-inch; or fine, minus-X-inch), are classified by a grade number that is standard for all Oliver ores. At this meeting it is decided what grades and how much of each grade is to be produced from each mine during the next three shifts.

After the meeting with the ore grader the Sherman mine superinten-

SHOWN ABOVE: Left, Arnold Ellingson, locomotive engineer, radios to the dispatcher that his train is nearly loaded. Center, dispatcher's tower. Right, William Trenberth, dispatcher, answers the locomotive engineer by giving him directions as how to proceed to the beneficiation plant.





MAINTENANCE BOSS of shovels, Joe Motherway, radios the dispatcher from his speeder to report that the shovel his crew was working on is now repaired. The dispatcher will in turn pass this information on to the general pit foreman.

dent and his assistants plan the mining program for the next 24 hours, to start at 3:00 p. m. when the second shift begins work. A plan is laid out as to what mines (within the Sherman Group) and what exact part of the mines the different grades of ore are to come from. When this is done shovels are designated to load so many cars from these areas. Extra shovels are used in the pits to enable this selective mining to be done without moving the shovels numerous times and over long distances. These spare shovels are also needed to permit maintenance.

Two 50-Watt Units

Two 50-watt, short-wave radio systems, each operating on a different frequency, are used at the Sherman.

These radios have a range of 10 miles. The base station of one unit is located in the surface building connected to the headframe of the underground Fraser mine. This building houses engineering offices and change rooms. Radios operating on the wave length of this unit are those used by the supervisory personnel. This includes radios in the vehicles of the mine superintendent, assistant mine superintendent, general pit foreman, pit foreman, mine engineer, mine engineering staff, general truck foreman, drill foreman, drilling and blasting foreman, and in the speeder of the general track foreman and his assistant.

The base unit of the second system is located in the dispatcher's tower. This tower is so located that all trains

entering or leaving the pits, the lean ore stockpiles, waste dumps, and crushing and screening plant pass near it and can be seen from the tower. Radios on this wave length are located in all haulage locomotives, locomotive-type switching cranes, in a speeder for the shovel repair crew, and at a temporary base station located near the switches at the lean ore and waste dumps.

Dispatchers at each of the two units are required by law to have a federal short-wave radio operating license. The dispatchers (one on each shift) who are located in the tower, as well as the switchmen located at the temporary station near the dumps, are former brakemen who were trained for this job. Brakemen were chosen for this work because of their knowledge of handling trains and the location of the many tracks in the pits. Communication between the two radio systems is by telephone. Messages to be sent from one unit to the other are relayed by the dispatchers.

Dispatcher—Important Man

The primary job of the dispatcher located in the tower is to dispatch the trains to the various shovels in carrying out the mining plans. Besides this, he also throws the necessary switches, by remote electrical control, leading to the crushing and screening plant and the dumping area.

The dispatching unit has what is known as a selective network. This limits the call from the dispatcher to two trains. However, if the dispatcher so desires, he can talk to all of the trains at the same time.

To understand exactly how this dispatching system works, let's follow a train which is unloading at the crushing and screening plant. When about two cars of the train remain to be unloaded, the locomotive engineer calls







OLIVER ENGINEERS who keep operations at the Sherman Group on a high level of efficiency: Left, Martin Forsmark,

mine superintendent; center, Edward C. Silver, assistant mine superintendent; right, William Reichel, general pit foreman.

the dispatcher and says, "locomotive No. 1203 leaving the plant." The dispatcher replies, "proceed to shovel No. 79" at such and such a location and gives the locomotive engineer the necessary directions as how to get there. and also throws the switches leading to the pit. The train arrives at the shovel and when it is almost loaded the locomotive engineer again calls the dispatcher and says, "locomotive No. 1203 leaving the pit." The dispatcher in turn gives him directions as what route to take to the plant and throws the remote controlled switches. This is the minimum number of calls between the dispatcher and the locomotive engineer when hauling ore to the plant. Additional calls given by the dispatcher may be to tell the locomotive engineer to slow down, or stop and let another train pass, or on his return trip to the pit he may be asked to stop and pick up supplies (Dipper teeth and small repair items) transporting them to the pit.

This same general communication takes place between the dispatcher and trains hauling lean ore or waste, except that a temporary radio station is located at the switches leading to the various dumps from which further directions are given. The switchman here tells the locomotive engineer what dump to take his train to and also throws the switches.

Ore from the Monroe mine, another Oliver mine located about three miles from the Sherman, is also crushed and screened at the Sherman plant. Locomotives pulling these trains are equipped with radios on the same frequency as the dispatcher's at the Sherman and are also under his control as to how to proceed to the plant.

Saves Steps and Miles

The need for this radio system is really known when it is found necessary to deviate from the original daily mining plan. Samples are taken at the crushing and screening plant and rapid analysis made, the results being sent to the ore grader. For example if the ore being mined is higher in silica than is wanted, the ore grader calls the mine superintendent and asks him to mine ore of a lower silica content. The mine superintendent examines his pit assay maps and determines where he can mine the required grade of ore and what shovel is near this area. He then calls the general pit foreman and tells him to stop mining with shovel No. 79 and instead use shovel No. 80 at a designated location. The general pit foreman then either calls the dispatcher in the tower on the phone, or, if he is in his vehicle, radios the dispatcher at the base station



TRAIN BEING LOADED with ore in one of the pits comprising the Sherman Group. The Sherman Group is Oliver's largest producer and is also the largest producer on the Mesabi Range; during 1954 5,977,917 gross tons were shipped.

to relay the mine superintendent's message to the dispatcher in the tower for passing on to the various trains that are to report to this shovel.

Besides the above cited examples the radio communication system is used for many other purposes providing a fast and easy method of issuing orders. The increased safety by using these short-wave radios is also an important advantage. If a serious accident should occur in one of the pits, within a few minutes a doctor could be notified and on his way.

This communication system at the Sherman Group has saved many steps and many miles by automobile. The success of this system can best be judged from the fact that since experimenting with radios at the Sherman Oliver has installed similar units at its Rouchleau Group and Mountain Iron Group mines near Mountain Iron, Minnesota,



SWITCHMAN, Rudolph Stornick, at the radio station near the stockpiles and waste dumps gives directions to an approaching train.



LOADED ORE TRAIN passes the dispatcher's tower on its way to the crushing and screening plant. Switches leading to and from the plant, stockpiles, and waste dumps are remotely controlled by the dispatcher, so that trains need not stop.



SHOVEL loading diamond-bearing gravel into a truck for haulage to the concentrating plant.

Diamates de Angola Operates 39

By R. G. WEAVIND

Diamonds, both industrial and gem, are being mined in the northeastern corner of Portuguese Angola. Here the Companhia de Diamantes de Angola (Diamang) operates 38 diamond-bearing gravel deposits scattered over an area approximately 30 miles in diameter. The diamond-bearing gravel is excavated and transported to small concentrating plants located near each individual deposit. Diamond concentrates from these plants are, in turn, up-graded at a central sorting station serving all of the 38 mines.

Remarkable Enrichments

The payable alluvial diamond deposits occur over a wide area that is traversed by the tributaries of the Kasai River. The diamond-bearing gravels stretch from Angola, northward across the border into the Belgian Congo, as far as the south bank of the Kasai River. To date, no primary source of the diamonds has been located in or near these fields.

It is known that the diamonds in these gravels come from an extensive, ancient gravel bed which was deposited over a very large and relatively flat area by a former drainage system. During the arid climatic period which followed, these ancient gravel beds were thickly covered by wind-blown sands under desert conditions; these sands are similar to those of the Kalahari of the Union of South Africa. In some places the sand reaches a thickness of about 120 feet, greatly impairing a thorough geological investigation of the underlying strata.

Subsequently, rivers and creeks cut deep valleys through these sands and the ancient gravel beds, reaching in several places the bedrock which is greatly decomposed. The rivers performed a work of natural concentration of the gravel beds by decomposing and washing away the less resistant mineral components, leaving behind the more resistant and harder minerals with the diamonds. In this process of gradual denudation, some of the bedrock material was mixed into the gravel deposits thus formed.

The diamond content of the gravels is usually low, but due to the concentrating action of the rivers, remarkable enrichments have taken place. As the rivers cut their way down through the sands and the gravel beds, localized concentrated gravel terraces were left on the slopes of the hills which constituted the boundaries of the valleys that were formed. In many instances these terraces were again covered by sand.

The gravel deposits in the terraces, as well as those in the floors and flood

plains of the present rivers, are now being extensively worked. The ancient hillside is in some places wellwithin the payable requirements, and is being explored on a large scale.

Complex Mineralogy

The mineralogical composition of the diamondiferous gravels is highly complex. Boulders and pebbles of granitic gneiss, hornblende, schist, pegmatite diabase, quartz-porphyry, quartzite, limestone, and sandstone are found, together with quartz, chert, agate, feldspar, and jasper as major constituents of these gravels. Besides these, a lesser quantity of heavy minerals, such as staurolite, kyanite, magnetite, ilmenite, tourmaline, garnet, chrysoberyl, spinel, rutile, pyrite, hematite, limonite, zircon, and several others occur together with the diamonds.

About 50 percent of the diamond production in Angola is of the gem quality. The sizes of the diamonds vary from 30 stones to the carat up to well over 10 carats each. The mineralogical and geological characteristics of the alluvial diamond deposits across the border of the Belgian Congo and around Tshikapa are very similar to those of Angola. Even the percentage of industrial to gem stones from this area is roughly the same.

The sand overlaying the gravel beds is first cut back to an angle which is

Mr. Weavind is with the Diamond Research Laboratory, Johannesburg, Union of South Africa



FRONT-END LOADER, mounted on Diesel tractor, is shown loading diamondiferous gravel.

Modern Diamond Recovery Plants

as steep as is consistent with safety. This is done by channeling the river along the bottom of the bank's face. Natives are stationed at various points of the face to loosen the sand so that it falls into the river below. As the face recedes, the river is diverted repeatedly towards the bank.

When the gravel beds are exposed, they are removed either by mechanical excavators or by hand. When mechanical methods are used, the gravel is dumped into trucks or into cars which are moved up to the face by endless rope haulage. Both the trucks and the endless rope haulage system deliver the gravel to the concentrating plants; there are 38 of the latter, one for each of the mining areas.

Recovery from Gravels

The methods used at the present time to recover the diamonds from the mined gravels are those common to this mineral; that is, sizing of the gravel followed by primary concentration in pans, then secondary concentration in jigs followed by the application of the jig concentrates to grease. However, a fair proportion of the diamonds which occur in the hillside and terrace gravels do not adhere to grease and must be picked out by hand from the grease table tailings. This is because of a film of iron oxide which covers the surface of the diamonds.

Construction of an HMS plant is being planned to treat the large quantities of hillside and terrace gravels which do not contain sufficient diamonds to make their recovery economically possible by the present methods. It has also been thought that the HMS concentrate should be chemically treated and grease belts provided for recovering the diamonds from this concentrate. This method is now being used by Consolidated Diamond Mines of South West Africa.

Plant Flowsheet

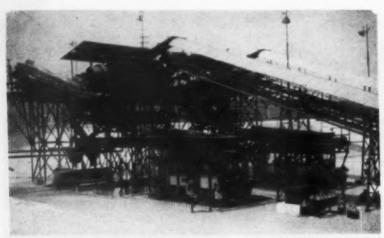
All of the concentrating plants, which are extremely well designed and kept in spotless condition, are similar in construction and therefore, only the flowsheet of one will be described.

Trucks or cars from the mine dump their loads of gravel into a bin at the concentrating plant. From this bin the gravel drops onto a conveyor belt that delivers it to a washing trommel fitted with a 25-millimeter (one inch) screen. The minus-25-millimeter material drops to two, 8- or 10-foot pans that are in series with each other. The oversize, plus-25-millimeter gravel is fed to a mill 15 feet in length and 24 inches in diameter. It has a smooth lining, and the speed of rotation is kept low to avoid breaking the diamonds. Oversized particles, which consist of balls of clay, rocks, etc., are mixed by its rotation until the clay and other soft conglomerates are broken up.

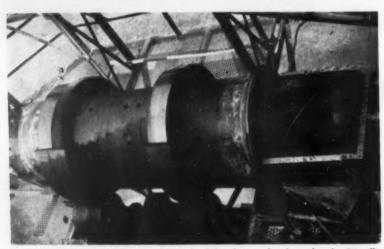
The mill is fitted with two screens: one at the discharge end on the inside and at right angles to the longitudinal axis; the other, a cylindrical screen attached to the discharge trunnion. Steel plate perforated with 12-millimeter (7/16 inch)-diameter holes composes the inner screen. Holes in the cylindrical wire-mesh screen are 25 millimeters in diameter. The central portion of the inner screen has been removed, leaving an aperture about two feet in diameter through which the larger particles can escape and prevent overloading. As the mill rotates, a helix attached to the inside of the cylindrical screen removes any particles larger than 25 millimeters. Screen undersize falls into concentrat-

Pan concentrates are automatically discharged through a gate in its bottom. Opening of the gate is controlled by a lever attached to one of the pan arms. Specific gravity of the pan puddle is controlled by carefully regulating the rate at which the mine gravel is dumped from the trucks.

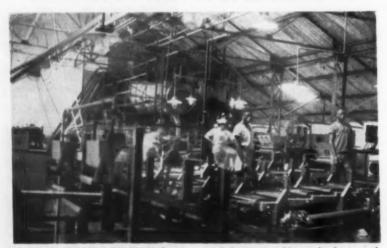
Pan concentrate drops to Hartz-type jigs, while pan tailing is dumped as waste. Jig hutches are emptied once each day into steel bottles of 27-liter capacity. When full, the bottles are closed and sealed by the white foreman in charge of the plant. Bottled



FIELD CONCENTRATING PLANT of which there are 38, each of them being located in one of the mining areas. These plants produce a low-grade diamond concentrate that is trucked to the central sorting station for up-grading.



SMOOTH-LINED MILLS are used at each of the plants to break up the plus-25-millimeter material containing balls of clay and soft conglomerates. The mill is operated at a slow speed of rotation to avoid breaking the diamonds.



CENTRAL SORTING STATION showing one of the grease tables in the foreground. Here diamond concentrates from 38 plants located at individual mines are up-graded. Six to eight tons of concentrates per day are handled by the central station.

concentrates are collected from each plant once a day and hauled by truck to the central recovery station.

Treating Concentrates

At the central sorting station the diamondiferous concentrate from each of the primary plants is treated separately. The concentrating machinery is meticulously cleaned after each run, and all diamonds that have been recovered are removed, cleaned, weighed, and credited to the deposit from which they originated.

The amount of concentrates received from the primary plants varies considerably, but on an average a total of six to eight tons are treated daily at the central sorting station. When the bottled concentrates arrive at the sorting station they are unsealed and the contents measured and recorded. They are then elevated to the level of the trommel screens and emptied. Here the concentrates are sized into the following fractions: 1.09 to 3.0 millimeters, 3.0 to 6.0, and 6.0 to 25.

The 3.0 to 6.0 millimeter and the 6.0 to 25 millimeter concentrates are fed directly to two, side-shaking grease tables. These tables are similar to those developed at Kimberley, South Africa. They differ in that each table has eight steps instead of the more usual two or four. The tables are 11 feet long, 29 inches wide. Each step is 16 inches long with a drop of about two inches per step. Rate of feed to each table is about 1.000 pounds per hour. The grease applied to the surface of the tables is a proprietary brand of petroleum jelly with a melting point of approximately 50° Centigrade.

Recleaning Concentrates

The loss of diamonds from the grease tables is aggravated by the fact that in some instances the diamond surfaces are wettable; this, again, is true of the hillside and terrace diamonds. To recover these diamonds, it is again necessary to treat the concentrates, after jigging and handsorting, by the following method.

First the 3.0 to 6.0 millimeter concentrate is ground in a ball mill. The mill used for this purpose is 18 inches long by 18 inches in diameter, and is charged with 320 pounds of steel balls. Ball mill discharge is regulated by a punched plate screen having %-inch openings. Fines are removed from the mill discharge by washing them through a cylindrical screen which is attached to the discharge end of the mill and has 1.09 millimeter openings. Rate of feed to the mill is 200 pounds

(Continued on page 72)



FISSION FACTS

Monthly Roundup of Mining News In the Atomic Energy Field

Anaconda Copper Steps Up Uranium Operations; Opens Crack Pot and North Jackpile Mines

Anaconda Copper Mining Company is stepping up its uranium ore mining rate and opening new mines in order to be for increased ore production for the mill expansion now underway at its Bluewater, New Mexico, operations. Mine expansion is underway at both limestone and sandstone mines with major empha-

sis on open pit operations.

A new mine called the Crack Pot has recently been opened to mine Todilto limestone ore in the southeastern part of the Laguna Reservation. At Anaconda's Section 9 mine northeast of the mill stripping of overburden has been expanded while regular mining continues.

One new mine has been opened in the Morrison formation to produce sandstone type ore. This is the North Jack-pile %-mile north of the Jackpile mine pile 8-mile north of the Jackpile mine and also on the Laguna Indian Reservation, five miles north of Laguna. This is being developed as an open-pit mine very similar to the Jackpile. Isbell Construction Company of Reno, Nevada, has the stripping contract for A, B, and part of the C waste benches. Anaconda is stripping waste for its own account on part of the C, on the D bench, and stripping and preparing for mining ore on the E bench.

Anaconda is shipping ore from the Jackpile to its Bluewater mill site by A.T. and S.F. Railroad. Ore is trucked five miles to the new railroad loading spur one mile north of Laguna and from there delivered by rail directly to mill

there delivered by rail directly to mill site over the new railroad spur.

site over the new railroad spur.

The limestone mill addition, using the caustic soda leaching method, is being installed, in part, in the existing mill building and, in part, in a new building extension, and will double milling capacity for limestone ores.

The two large buildings to house the new sandstone milling unit have been completed, and construction is under-way on the ore bins and a second crushing plant.

ing plant.

Anaconda signed a contract with the United States Atomic Energy Commission for expansion of the carbonate leach mill and construction of an acid leaching unit on May 18, 1954. This contract was subsequently modified on September 15, 1954 to provide for expansion of the 15, 1954 to provide for expansion of the acid milling unit during its construction.

C. F. Kelley, chairman of the board of Anaconda, has announced that all the new units would be placed in operation during 1955.

Jesse C. Johnson, director, raw ma-terials, AEC, recently announced that stockpiled ore at Bluewater would supply feed to the present carbonate mill for 10 months and was sufficient for only four months' operation of the en-larged carbonate mill and the sandstone

In addition to expanding milling and mining capacity, Anaconda is continuing

its exploration and geological program. While the present series of atomic blasts in southern Nevada may make it im-possible or difficult to do any accurate radiometric prospecting, the exploration drilling program continues. When the fall-out resulting from the atomic tests has been dissipated in the area, Ana-conda will resume use of its recently purchased Bell helicopter as well as its Piper Supercub for detailed airborne

radiometric surveys.

Jack Knaebel is New Mexico manager Anaconda's operations and supervises all exploration, mining, and milling for the company.

Rio Tinto, Ltd. Negotiating In Australia Uranium Area

United Uranium N.L., Northern Territory, Australia, has entered into nego-tiations with Rio Tinto, Ltd. for pros-pecting its areas in the South Alligator River zone. Negotiations are also taking place between Rio Tinto and North Australian Uranium Corporation regarding the Sleisbeck area. It is reported that any operating companies set up probably will be controlled by Rio Tinto with the Australian firms keeping the holdings. If ore reserves prove sufficient, Rio Tinto

may build a treatment plant in the area.

Also in the Northern Territory, the first parcel of uranium ore from a privately owned company has been sampled vately owned company has been sampled at the Rum Jungle treatment plant. An average of 0.7 percent U₂O₈ had been anticipated for ore from the Uranium Development and Prospecting N.L., but the Rum Jungle sample indicated 0.396. Tonnage of the ore was 391.77. A 250-ton lot is awaiting shipment to the treating plant.

Utex Uses Gismo to Drive New Low Level Crosscut

Utex Exploration Company has started to drive its new low-level crosscut to facilitate increased production and speed development of the northern section of the Mi Vida mine. This new level was portaled near the bottom of Steen Canyon several hundred feet west of the in-clined shafts through which all production from the mine has been made. The adit will be driven entirely in Wingate hanging wall beds to the ore bearing Chinle D horizon. Beds to be traversed consist of buff to red sandstone, siltstone, and mudstone. The adit will be about 1,700 feet long.

Utex is using one of the new low head Gismo units for driving the heading. (This unit was first described in the technical press in the February 1955 issue of MINING WORLD.) After the adit is completed the Gismo will be used for stoping with ore being hauled to the surface in mine cars over the tracks used in driving the adit.

in driving the adit.

Charles Steen is president and chief geologist for Utex, and Virgil Bilyeu is mine superintendent. Because of too much ore being shipped to the AEC's Moab ore buying station, Utex has voluntarily reduced its shipments so that smaller operators will have a chance for their ore to get sampled, according to Steen

Peru Government Confirms Uranium Ore Discoveries

The existence of uranium in the Colquijirca mines, which are owned by the Fernandini interests in Peru, has been verified by the Board of Control of Radioactive Substances in Peru. Govern-Radioactive Substances in Peru. Govern-ment geologists, in collaboration with stiff members of the United States Atomic Energy Commission, found that U.O., content averages 2.46 percent, with some assays as high as 3.7 percent. Extent of the mineralization which is

Extent of the mineralization which is located near the Cerro de Pasco properties, has not yet been determined.

A previous report of the Board of Control announced that material with a U₂O_s content of 1.8 percent had been found in the Vilcabamba region of southern Peru. Prospects for uranium production in Peru are believed to be very good if the volume of the newly discovered deposits is sufficient to warrant commercial production. rant commercial production.

Climax, St. Anthony in New Mexico U.O. Search

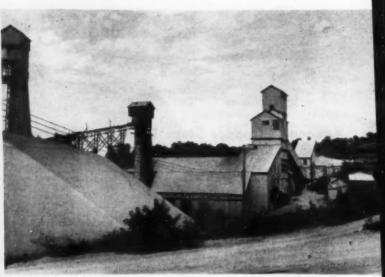
Climax Molybdenum Company, Climax, Colorado, has recently acquired an interest in St. Anthony Uranium Corporation, lessee of the Cebolleta land grant located in Valencia County, New Mexico. Under an operating contract with St. Anthony, Climax Molybdenum is cur-rently carrying on an exploration of the Cebolleta grant. Previous drilling by St. Anthony had indicated favorable uranium showings and the present Climax pro-gram is intended to ascertain the existence of ore and to further explore favorable structure within the 20,000-acre tract. The Cebolleta grant is northeast of the Laguna Indian reservation where Anaconda Copper is presently develop-ing its Jackpile and North Jackpile ore

St. Anthony Uranium Corporation is a recently organized Nevada corporation. Overall direction of the St. Anthony exploration is under Frank Coolbaugh, vice president of western operations for Climax Molybdenum Company.

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DUMPTORS waste no time in dumping their load of ore at the mill by having to turn around as other trucks would need to.



GRAY MILL of Tri-State Zinc, Inc. where 1,050 tons of zinc-lead ore are treated daily in a mill designed for only 850 tons. The high part of the building is a headframe.

How Tri-State Zinc's Efficient Management Lowers Milling Costs

This story on Tri-State Zinc's milling operation near Galena, Illinois is the second of two parts. An article on their mining operation was carried in the March 1955 issue of MINING WORLD.

In the Upper Mississippi Valley zinc-lead district near Galena, Illinois, Tri-State Zinc, Inc. continues to meet the low metal price by cutting operating costs. Its total milling cost, 78.5 cents per ton, is one of the lowest for any zinc-lead sulphide mill. Tri-State Zinc's Gray mill which was designed for 850 tons is now handling approximately 1,050 tons per day and still maintaining a good recovery. How do they do it. . . . ?

At the mill, trucks hauling ore from the mine dump onto a bar grizzly having 20- by 30-inch openings. The occasional boulder that does not pass through is broken by the crusher operator. Underneath the grizzly is a 50-ton surge bin. A 36-inch apron feeder delivers the ore from this bin to a 21- by 36-inch primary jaw crusher set at 3½ inches. Crushed ore falls to a 20-inch belt conveyor discharging into a 300-ton storage bin. From this bin a 24-inch belt feeder transports the ore to a 10- by 24-inch secondary jaw crusher set at 1 inch. Minus-1-inch ore falls to a set of 36-inch rolls spaced % of an inch apart. After passing through the rolls, the

MILL SUPERINTENDENT John Fitzgerald steps up mill capacity, keeps recovery high, and lowers milling costs.

ore drops into the boot of a bucket elevator, discharging into a trommel screen. The trommel screen has ½ an inch round hole perforations. In closed circuit with the elevator and screen is a set of 30-inch rolls spaced ¼ of an inch apart. Screen oversize is recrushed with these rolls. Undersize from the screen goes to a 20-inch Esperanza-type drag belt classifier for dewatering.

Jigs Preconcentrate

Classifier underflow is split at the center cells of an eight (36- by 42inch) cell, Cooley-type jig, each half of the feed being sent to four cells. In describing the jig flow-sheet, only one half (four cells) will be referred to, each half of the jig being operated identically. The screens of the first three cells of the jig have openings of ¼ inch; the last cell has a 3/6-inch screen. The hutch product of the first cell is delivered with a 12-inch bucket elevator to a single (36- by 36-inch) cell, Cooley-type jig for re-cleaning. The hutch product from this cell is a lead concentrate averaging 70 percent lead. This is stored in a bin awaiting shipment to the smelter.

[World Mining Section-14]

The hutch product from cell numbers two and three joins the lead cleaner cell tailing and the overflow from a tailing classifier in a 24-inch bucket elevator which discharges to a 16-inch-drag dewatering classifier. Hutch product from the fourth cell is returned to the boot of the elevator discharging to the trommel screen. This is because of the limited capacity of the ball mills. Were it not for this factor, it would join the hutch material of cells two and three.

Tailing coming off the fourth jig cell is dewatered with a 16-inch-belt drag classifier. A sample of the tailing for assaying is taken with a Galigher sampler before the tailing is discharged with two bucket elevators to the waste pile. This tailing amounts to about 50 percent of the initial feed.

The jig middlings in the 16-inchdrag dewatering classifier are joined by the overflow from the dewatering classifier ahead of the jigs. Overflow from this 16-inch classifier runs to a 50-foot thickener. Overflow from the thickener flows to waste.

Underflow from the 16-inch classifier drops on to a splitter dividing the ore stream. A portion of the feed enters a 16-inch by 6-foot Hardinge conical ball mill in closed circuit with a 30-inch by 17-foot Wemco spiral classifier. The remainder goes to a 5- by 8-foot Colorado Iron Works ball mill in closed circuit with a similar Wemco classifier.

Two-Cell Pb Circuit

Overflow from the ball mill classifiers, minus-48-mesh enters a 16-inch bucket elevator. Here it is joined with settlings pumped from the thickener. The elevator dumps into a 6- by 6foot lead conditioner. From the conditioner the pulp flows to two 56-inch Fagergren cells. Underflow from the first cell enters the second. Froth from both cells is re-cleaned on a Butchart table to remove the oil rock (gangue). Concentrate from this table goes to the lead flotation concentrate bin. Tailing from the table is returned to the elevator discharging into the lead conditioner.

Six 56-Inch Zinc Cells

Underflow from the second lead cell enters an 8- by 8-foot zinc conditioner. Middlings from this conditioner enter the number one cell of a bank of five-56-inch Fagergren cells. Underflow from each cell passes on to successive cells. Tailing, underflow from the last cell, is sampled with a Galigher sampler before going to the tailing pond.

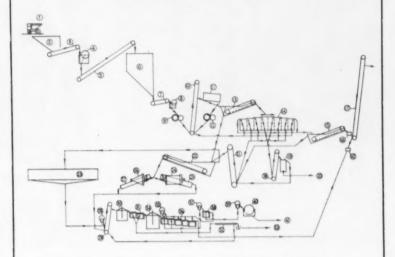
Number one and two cells are roughers. Froth from these two cells is pumped to a separate cell; another

FLOW SHEET

Gray Mill

Tri-State Zinc. Inc.

Galena, Illinois



- Dumptors, Koehring, 6-cubic-yard. Surge bin, 50-ton.
- Surge bin, 50-ton. Apron feeder, 36-inch.
- Primary jaw crusher, Rogers Iron 25. Works, 21- by 36-inch. Belt conveyor, 20-inch.
- Storage bin, 300-ton. Belt feeder, 24-inch.
- Secondary jaw crusher, Rogers Iron 28. Works, 10- by 24-inch. 29. Rolls, 36-inch. 30.
- Bucket elevator, 24-inch. Trommel screen, 4 by 8 feet.
- Rolls, 30-inch. Dewatering classifier, Esperanza-type, 32.
- Dewatering classifier, Esperanza-type, 16-inch belt.
- Jig tailing Sampler Caligher. Tailing stacker, bucket elevator, (2). Bucket elevator, 12-inch.
- Cleaner jig, Cooley-type, single-cell, 36- by 36-inch.
- Jig lead concentrate bin.
- Bucket elevator, 24-inch. Dewatering classifier, Esperanza-type, 16-inch belt.

- 23. Thickener, Dorr, 50-foot.
- 24. Ball mill, Colorado Iron Works, 5 by 8 feet.
- Spiral classifier, Wemco, 36-inch by 17-foot.
- 26. Ball mill, Hardinge, 16-inch by 6-foot.27. Spiral classifier, Wemco, 36-inch by 17-foot.
- Diaphragm pump, 4-inch. Bucket elevator, 16-inch.
- Lead circuit conditioner, Denver Equipment, 6- by 6-foot.
- 31. Lead circuit flotation cells, Fager-gren, 56-inch, (2). Table, Butchart.
- 20-inch belt.
 Rougher jig, Cooley-type, eight-cell, 33. Lead notation concentrate.
 Rougher jig, Cooley-type, eight-cell, 34. Zinc circuit conditioner, Denver 36- by 42-inch.
 Equipment, 8- by 8-foot. Diaphragm pump, 4-inch.
 - 36. Zinc flotation machines, Fagergren,
 - 56-inch, (5). Diaphragm pump, 4-inch.
 - 38. Zinc cleaner flotation cell, Fagergren, 56-inch.
 - Diaphragm pump, 4-inch.
 Filter, American, 3 leaf, 6-foot.

 - Zince concentrate bin.
 - 42. Flotation tailing sampler, Galigher.

56-inch Fagergren acting as the cleaner. Underflow from this cleaner cell joins the froth from cell number three, four and five which are the scavengers and is pumped to cell number one.

Froth from the cleaner cell is pumped to a three-leaf 6-foot American filter. The filtered product, zinc concentrate, falls into a concentrate storage bin. A pilot table is used for visual inspection of the zinc flotation concentrate. Zinc concentrate averages 62.60 percent zinc. The overall metallurgical recovery obtained is approximately 90 percent.

Reagents Used

Reagents added to the lead conditioner are Aerofloat 242, sodium cy-



ZINC CONCENTRATE averaging 62.60 percent zinc drops off the three-leaf American filter into a storage bin; later it is trucked to the railway loading point.



ZINC FLOTATION CELLS: Six 56-inch Fagergren cells comprise the zinc circuit. Total cost of reagents used amounts to 8.725 cents per ton of flotation feed.

anide, and sodium xanthate. In the zinc conditioner copper sulphate, sodium Aerofloat, Aero 645, pine oil, and lime are added. Methyl Isobutyl Carbinol (MIC) is added equally to each of the first three zinc cells. The total cost of the reagents used is 8.72

cents per ton. For the amount and cost of each reagent per ton, see the accompanying table.

Mill Labor

Milling operations are on a six-day week, 24 hours a day. Fourteen men

BUTCHART TABLE, in closed circuit with the lead flotation circuit, is used to remove the oil rock from the lead froth. This procedure is standard for this district where it is impossible to obtain clean separation by flotation alone.

are employed in the mill, in addition to the mill superintendent. Of these, three are flotation operators; three are jig operators; five are crusher operators; and three are employed for miscellaneous work. Three of the rusher men operate the secondary crusher. The other two men operate the primary crusher which crushes on only two shifts.

The mine and mill maintenance crew at Tri-State consists of five men: one warehouse man, one carpenter, two mechanics, and one electrician.

Reagent Consumption Tri-State Zinc, Inc., Galena, Illinois

Reagent	Amount used per ton of flotat on feed	Cost in cents per ton	
Lead circuit:			
Aerofloat 242*	0.021 pounds	0.722	
Sodium cyanide*	0.041 pounds	0.439	
Sodium xanthate®	0.009 pounds	0.114	
Zine circuit:			
Copper sulphate**	0.886 pounds	5.070	
Sodium Aerofloat **	0.067 pounds	0.980	
Aero 645°°	0.027 pounds	0.515	
Lime**	1.148 pounds	0.558	
Pine oil**	0.006 quarts	0.123	
MICE	0.019 quarts	0.204	
	Total cost	8.725	

^{*}Added to lead conditioner. **Added to zinc conditioner. †Added to first three cells of zinc

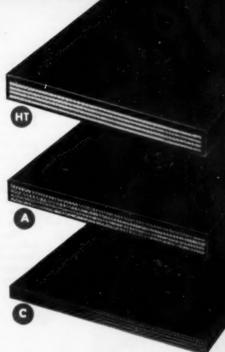


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Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life . . . lower your handling costs per ton. Your Thermoid Distributor carries a complete line of Thermoid Conveyor Belting, Multi-V Belts and Hose to meet the most severe requirements of any mining operation. Call him or write direct for full information.



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But, Ali Pasha also had a deadly enemy, Raschid Pasha, who hated him and coveted his treasures and whose trained assassins awaited—and struck.

Realizing that his beloved treasures might now fall to his enemy, Ali gave one last command: "Smash the great diamond—before my eyes, and my dear wife, let her be strangled." But, while the slave was hammering the jewel to dust, Vasilica quietly slipped away and escaped.

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- Maintains uniformly low pressure drop!
- Field-proven
 efficiency as high
 as 99.99%!

Backed by the same organization that pioneered commercial application of Cottrell Precipitators and Multiclone Collectors, the Dualaire Reverse-Jet Dust Collector is revolutionizing filter-type recovery systems. The Dualaire gives you vital advantages like these...

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cleans the filter tube continuously in small increments—not with sudden surges as in rapping or jarring.

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Standard Engineer's Field Report

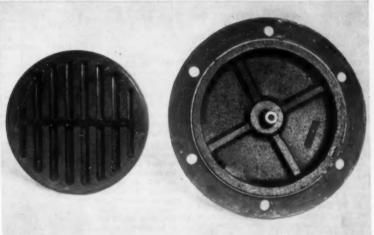
CASE HISTORY

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NOTE CLEANLINESS of this valve port, channel valve and cover (left to right) when removed for first time from a two-stage air compressor...after 40,680 hours of work! Lubricated with Calol Multi-Service Oil since installation 11 years ago, the unit supplied air—5000 cubic feet per minute—for a giant Arizona copper mine. Compressor was housed in open shed where dust and grit were always present in the air...yet there was practically no wear or formation of deposits. Since moved to another mine site, the compressor still has all its original parts.

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Personalities in the News-

Vanadium Corporation of America has announced several executive changes. Howard C. Parkman, plant manager at Niagara Falls, New York, has been named assistant vice president, operations, with headquarters at the Niagara Falls operation. Succeeding him as plant manager is C. A. J. Schulte. R. T. Bailey was named assistant to the vice president-production manager. He was previously assistant plant manager at Niagara.

Ted Becker, chief mining engineer at American Zinc, Lead and Smelting Company's Grandview mine near Metaline Falls, Washington, has been hired by the Loma Uranium Corporation, Denver, Colorado. He will work as geologist and mining engineer for

the new firm.

Charles E. Melbye, fomerly instructor in geology at the Colorado School of Mines, is now a partner in Minerals Exploration Research Corporation, consultants in mining geology and geophysics, with headquarters in Golden, Colorado.

M. M. Hardin, Albuquerque, New Mexico, has been elected a director of Kennecott Copper Corporation.

Hugh Wright is the new executive secretary of the Tri-State Zinc and Lead Ore Producers Association, Picher, Oklahoma.

Fred Stewart, general manager of the Southwest Potash Corporation, Carlsbad, New Mexico, has been named vice president of the company.

R. F. Robinson is now working for the Bear Creek Mining Company in Tucson, Arizona. He was formerly chief geologist for the Sunshine Mining Company in Kellogg, Idaho.

Julian Ashby, district geophysicist with the Atlantic Refining Company, Bismarck, North Dakota, has accepted a position with the Utex Exploration Company, Inc., and Moab Drilling Company, both of Moab, Utah.

Speakers at a recent meeting of the Mining Association of Southern California in Los Angeles, California, were G. Austin Schroter, Victor M.



GEORGE H. DEIKE (left), founder and board chairman of Mine Safety Appliances Company, Pittsburgh, Pennsylvania, is shown above receiving the Erskine Ramsay Gold Medal Award at the annual meeting of the American Institute of Mining & Metallurgical Engineers in Chicage, Illineis. Presenting the award was AIME President LEO F. REINARTZ (right), who is vice president of Armace Steel Corporation, Middletown, Ohio.

Arciniega, and Charles A. Lee. The group discussed various aspects of the uranium industry and its possibilities in Southern California.

C. C. Hawes, chief chemist at Cleveland-Cliffs Iron Company, Cleveland, Ohio, has retired and been replaced by Owen Hassett.

James A. Lee, division industrial relations director, and James E. Petersen, division labor relations director, were among recent appointments at the Ray Mines Division, Kennecott Copper Corporation.

New officers of the Uranium Corporation of America, Salt Lake City, Utah, are the following: Ramon N. Bowman, president; A. L. Hohman, vice president; Carl H. Hulbert, secretary-treasurer; Shirley J. Hansen, assistant secretary; K. Ralph Bowman, chairman of the board. The firm was the result of a recent seven-way merger of a group of Utah mining companies.

Arthur B. Hall, Superior, Arizona, has been appointed chief chemist for Magma Copper Company. He had been employed previously by the firm as an assayer and chemist.

ALVIN F. KROLL has been named superintendent of the milling department, Bunker Hill & Sullivan Mining & Concentrating Company. He succeeds C. Y. GARBER, who retired after 36 years with the company. Mr. Krell has been with Bunker Hill since 1930.



He worked in a number of positions at the lead smelter until 1952 when he was transferred to the concentrator plant as assistant superintendent. Succeeding him as assistant is FRED L. PRINDLE.

Charles R. Hubbard has been named mining engineer for the Idaho Bureau of Mines and Geology. Virgil W. Carmichael was named minerals analyst for the bureau.

Fred E. Burnet, operating superintendent of the Montana Phosphate Products Company, Garrison, Montana, has been elected president of the Mining Association of Montana.

K. D. Loughridge, American Smelting & Refining Company, has been transferred from Leadville, Colorado to become assistant superintendent of the lead department at the firm's El Paso, Texas smelter. Succeeding him as assistant superintendent at Leadville is Lester Brown.

Carl Tolman, member of the faculty at Washington University, St. Louis, Missouri, has been elected vice-president and chairman of the geology and geography section of the American Association for the Advancement of Science.

Donald A. Jess, formerly with the Bradley Mining Company, Stibnite, Idaho, has joined the staff of Manganese, Inc., in Henderson, Nevada as an analytical chemist.

Two key promotions have been announced by The New Jersey Zinc Company, with executive offices in New York City. SID-NEY S. GOODWIN (top), vice president in charge of mining and exploration, has been elected a director of the company. He is a veteran of 24 years service with the firm. LINDSAY F. JOHNSON (bottom), who has been assistant to the president for the last year, has been named a vice president. He has been with New Jersey Zinc for 13 years, serving for much of that time in relations employee





activities. The two men will continue to make their headquarters in New York City.

John Blixt, senior geologist for The Texas Company, has joined the Denver, Colorado firm of Halbert and Jennings as an oil and uranium exploration expert. During 1950-51 he served in Australia for Cal-Tex and was instrumental in the firm's first discovery of oil there.

Franklin E. Johnson, mine shift foreman at the United States Potash Company, Carlsbad, New Mexico, has been promoted to mine mechanical supervisor.

Fred Howell, geologist with Haile Mines, Inc., Henderson, Nevada, has accepted a position with Kennecott Copper Corporation's exploration division, Bear Creek Mining Company. He will be working at the firm's Santa Rita, New Mexico offices.

Clarence H. Sleeman, assistant to the manager of Jones & Laughlin Steel Corporation's Minnesota Ore Division, has been promoted to assistant manager. He was employed by Jones & Laughlin as a mining engineer in July 1946 and was promoted to assistant general mining engineer in 1951. He has been assistant to the manager since 1953.

Scott L. Burrill, acting mill general foreman, has been named mill general foreman at the Nevada Mines Division, Kennecott Copper Corporation. Other promotions announced by the division include William Mansfield, who was transferred from chief engineer, power plant, to assistant mechanical-electrical superintendent; Theo L. Anderson, moved up from master mechanic to mechanical superintendent, mining department; George L. O'Boyle, from machine shop foreman to mechanical department general foreman; and Donald B. Tate, from tool room machinist to machine shop foreman.

Frank B. Hunter has been appointed division geologist for the Industrial Minerals division of International Minerals & Chemical Corporation. He will direct an expanded exploration program for the division.

H. J. Fraser, vice president and general manager of Falconbridge Nickel Mines, Canada, was re-elected president of the Canadian Metal Mining Association.

New employees at Cerro de Pasco Corporation's Lima, Peru, headquarters are Fred P. Gerbracht, mining project engineer; Ronald Naftal, junior mining engineer; and Arthur J. Post, construction foreman.

George H. Cornelius and Harold Lawhead, Kodiak Island, Alaska, have taken over control of the Peninsula Exploration Company. The group is active in prospecting copper and other deposits on Kodiak and Sitkalidak Islands.

Charles Will Wright, Washington, D.C. consulting mining engineer, and Vic Rakowsky, George Garrey, and Ben Vallet, all graduates of the Michigan College of Mines, were made members of the Legion of Honor Class of 1905 at the recent American Institute of Mining and Metallurgical Engineers convention in Chicago, Illinois.

Robert B. Coons, vice president of American Potash & Chemical Corporation, has been named a director of the firm. He joined American Potash in 1946.

Wray Farmin, director, recently succeeded Frank M. Rothrock as vice president of Day Mines, Inc., Wallace, Idaho. Mr. Farmin, a son-in-law of Mr. Rothrock, is from Spokane, Washington and has been associated with the Day company since its organization in 1947.

OBITUARIES

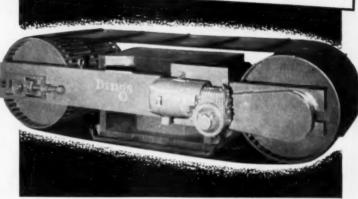
Theodore J. Hoover, 84, dean emeritus of the Stanford University School of Engineering, Stanford, California, died February 4 at his home in Santa Cruz County, California. A distinguished mining engineer, Mr. Hoover held many executive and administrative positions in United States mining companies before joining the Stanford faculty in 1919. His duties took him to Australia, India, Russia, Finland, Germany, France, and Asia Minor, and he was the author of several authoritative texts on mining. He was the older brother of former President Herbert Hoover.

Henry Hardenbergh, 72, chairman of the board of directors of The New Jersey Zinc Company, died February 9 in New York City. Mr. Hardenbergh had joined New Jersey Zinc in 1905 as a chemist. Advancing through the organization, he was elected president and director in 1943 and in 1951, chairman of the board.

Robert Balk, principal geologist at the New Mexico Bureau of Mines and Mineral Resources, was killed February 19 when a plane in which he was flying to Washington, D.C. crashed near Albuquerque, New Mexico. Until 1952, when he joined the bureau, Dr. Balk was professor of geology at the University of Chicago.

James B. McKay, 40, mining engineer at the E. I. du Pont de Nemours, Inc. laboratory at Trail Ridge, Florida, was killed in an automobile accident early in February. He was a graduate of the New Mexico University School of Mining and Geology and was a member of the American Institute of Mining Engineers.

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INSTALLATION: GM "3-71" Diesel drives 250-volt generator powering Joy shuttle car in underground gypsum mine. Scrubber used on exhaust.

PERFORMANCE: Unit working up to 15 hours a day hauling ore up 12% grade to crusher. Fuel cost--\$1.70 per day. Maintains full speed all day long instead of slowing up after 5 or 6 hours as their batterypowered cars do. Plant engineer Art Lund says GM Dieselpowered unit is "more economical than we planned on."





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in International Mining

TOSHIO NISHIMURA. who was formerly chief engineer at the Milke Zinc Smelter, near Omuta, Japan, assumed the has position of manager the Kushikino Gold Mine, Kagoshima-ken, Japan. The Milke refinery, owned by Matsui Mining & Smelting



Company, recently underwent an extensive modernization program.

Charles E. McGraw has been named general manager and vice president of Marcona Mining Company, Lima, Peru, succeeding Harlan Walker, who returned to the United States early this year. Mr. McGraw was construction engineer for the Sisga Dam project in Colombia. During World War II he served in the Army Corps of Engineers and was in charge of the construction of Ledo Road in the India-Burma area.

Mohamed Samih Afia, geologist with the Egyptian mining department, has completed an expedition to the country's Eastern Desert. He recently returned from another government trip to the Rhodesias.

C. T. Potgieter, mine geologist with Mufulira Copper Mines, Ltd., has left the Northern Rhodesian mining firm, to accept a position with Union Corporation, which has several mining operations on the Rand.

ration, which has several mining operations on the Rand.

Kenneth N. Crawford has been elected to the Board of Directors of Cyanamid Products, the London, England subsidiary of the American Cyanamid Company, New York.

Levy Blum, chemical engineer with the Variable Line London London Production is now

Levy Blum, chemical engineer with the Israel Mining Industries, is now studying mining techniques in the United States under the Point Four technical assistance program. He recently visited the Ray Mines Division of Kennecott Copper Corporation, Arizona. Israel Mining Industries, a government group, does exploration and development work in the country's phosphate and new copper mining industry. Future plans for the industry call for copper smelting facilities to be set up in Haifa.

be set up in Haifa.

A. F. Banfield, geologist and director of Behre Dolbear & Company, New York City, has been in Spain on professional business.

Roscoe H. Cannon, resident manager of the Toledo, Cebu mine of Atlas Consolidated Mining and Development Corporation in the Philippines, has taken over his duties at the mine after a two-month trip to the United States. He was general superintendent at the San Mauricio Mining Company operations for four years before assuming his present position. Atlas has just started operating its 4,000-ton per day flotation mill at the mine, which is the largest copper mine in the Orient.

H. J. Altschuler, formerly general manager of Frontino Gold Mines Limited in Colombia, is now chief engineer at the St. John d'el Rey Minist Company, Ltd.'s gold mine at Nova Lima, Brazil.

Floyd O. Merrill, formerly of Balatoc Mining Company, Philippine Islands, was recently appointed general superintendent of Hixbar Gold Mining Company's property at Rapu Rapu, Albay, Republic of the Philippines.

Thomas L. White is the general mines manager at Societe La Tie-baghi, Paagoumene, New Caledonia.

Donald D. Belcham, general manager of South Crofty Mine in Wales, has been appointed to the company's board of directors.

R. R. Porter has resigned his post as uranium consulting metallurgist to the Transvaal and Orange Free State Chamber of Mines and has returned to his home in Salt Lake City, Utah. He had been engaged for several years in establishing the uranium extraction plants and processes in South Africa.

Evert Wijkander, president of the Swedish Iron Institute, has been appointed honorary vice president of the Iron and Steel Institute, London, England. Gosta Frisell, director of the Swedish group, was made an honorary member.

M. I. Chowdri, Fazliomar Research Institute, Lahor, Pakistan, has taken over as chief metallurgist of the Pakistan Ordnance Factories, Wah Cantt, Punjab, Pakistan.

Philip Dodd and Robert Pitman, geologists with the United States Atomic Energy Commission, have returned to the U. S. from a two-year assignment in Australia. During that time they were assigned to the Australian Bureau of Mineral Resources and worked with the Australian government on its uranium program.

J. M. Birkbeck, formerly geologist with Cerro de Pasco Corporation, is now manager of Consolidated Guayana Mines, Ltd., in Lima, Peru.

G. J. Oorthuys, Dutch mining engineer, has been transferred to the Billiton Mining Company operations in Indonesia. Previously, he was stationed at The Hague, Netherlands.





Key figures in the mechanization program which was recently completed at the Kerea Tungsten Mining Company's Sang Dong mine near Seoul, Korea, are LEE SANG KU (left), manager of the mine, and AHN BONG IK, president of the firm and a metallurgical engineer. The operation, considered the most modernized tungsten mine in Kerea, was set up with the help of the Utah Construction Company, which recently completed a technical assistance contract with the Korean manual contracts.

ROBERT E. BRUCE, personnel afficer for Mufulira Copper Mines, Ltd., Northern Rhodesia, is traveling in the United States an a fellowship from the international Labor Office, a division of the United Nations. He recently made a study of personnel



study of personnel management at the Calumet Division, Calumet & Hecla, Inc., in Michigan.

J. B. Haworth is now with Sherritt Gordon Mines, Ltd., Fort Saskatchewan, Alberta, Canada. Formerly, Dr. Haworth held a position in Cheshire, England.

Peter Richardson, who recently came to the Philippine Islands from Peru, has been named mine foreman at Balatoc Mining Company, Mountain Province.

Maurice Cook, joint managing director of the metals division, Imperial Chemical Industries, has been elected chairman of the British Non-Ferrous Metals Research Association. He is a past president of the Institute of Metallurgists and senior vice president and president elect of the Institute of Metals.

M. W. Howell, mine superintendent of Zinc Corporation and New Broken Hill Consolidated, has been appointed manager of Broken Hill South, Ltd., New South Wales, Australia.

R. L. Prain assumed the title of president of the Roan, Mufulira, Rhodesian Selection Trust, and Chibuluma companies the first of this year. He is also chairman for the firms.

J. A. McAllister, metallurgist, formerly with American Cyanamid Company's research laboratories at Stamford, Connecticut, is now with South African Cyanamid (Pty.) Ltd., Johannesburg, South Africa.

F. G. Sharp is now superintendent of the Hyderabad Gold Mines Company Limited, Hutti, India.

M. A. Kuryla, director of safety and employe services, United States Smelting, Refining & Mining Company, has been named assistant manager at Lima, Peru, for the Cerro de Pasco Corporation. He will handle industrial relations, purchasing, and accounting at the Lima division of the copper firm. Mr. Kuryla has served in various mining engineering capacities for U.S. Smelting in Utah and in Mexico.

R. A. Willey, general superintendent of Philippine Iron Mines operations at Larap, Philippine Islands, has completed a tour of Hong Kong and Japanese mining operations. While in Hong Kong he visited the Ma On Shan iron mine.

F. R. Morgan has been appointed to the position of secretary and manager of Western Mining Corporation, Ltd., Australia. He succeeds retiring manager L. Edwards.



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American Chrome

(Continued from page 40)

laundered to the slime section, and the underflows fed to 15 Wilfley tables. Finished concentrate is collected from each table and stockpiled. The middling from each table is recycled back to the de-watering classifier at the head of the middling circuit.

Slime Treatment Section

This section of the plant is fed from five sources within the plant at American Chrome's mill. These include:

- Overflow from the two Wemco hydroseparators in the coarse primary feed circuit.
- Overflow from the hydraulic classifier in the coarse primary feed circuit.
- Overflow from the de-watering classifier in the middling section.
- Overflow from the middling hydraulic, hindered settling classifier.
- Overflow from the de-watering classifier handling finished concentrates.

Feed from these various sections is channeled to one Dorr 40-footdiameter and two Dorr 26-foot-diameter thickeners. Thickener overflow is collected in a settling sump and the water returned to the mill circuit by a Fairbanks-Morse 1,500 gallon-perminute pump. The underflow enters a splitter box feeding 14 tables in the slime circuit. These tables produce a finished tailing and concentrate. The middling is further treated in seven tables which also produce a finished concentrate and tailing. The middling from these latter tables is recirculated back to the head of the slime treatment section. The DorrClone noted on the flowsheet is used intermittently depending on requirements.

Finished Concentrates

Finished concentrates produced at the four points in the mill are dewatered in two 36-by 17-inch spiral classifiers. The classifier sands are conveyed by a 10-inch by 16-foot screw conveyor to a belting system which distributes the material in three temporary storage areas, each of which will hold a 24-hour run. Hough Payloaders remove the jet-black concentrate from the temporary stockpile, and load it on trucks for haulage to the permanent stockpile.

The manager at the Mouat operation is John Bley, and William Hisle is mill superintendent. Henry A. Doerner, consulting metallurgist, made a special study of the classifying opera-

tions.

Illinois Zinc May Merge With Canadian Firms

Consolidation of Illinois Zinc Company with two Canadian firms—Canadian Javelin Ltd. and Boon-Strachan Co., Ltd.—is now being considered by stockholders. The new firm would be called Illinois International Iron & Zinc Corporation. Morris Blumberg, chairman of Illinois Zinc, would become president of the new firm, and John C. Doyle, chairman of Canadian Javelin, would become chairman.

Illinois would receive all of the assets of the Canadian companies in exchange for 1,216,500 shares of Illinois Zinc stock which would give Canadian Javelin stockholders control of Illinois Zinc. Under the proposal, Illinois Zinc would issue 1,061,560 shares of its stock to Canadian Javelin for all of that firm's assets, and also would issue 155,000 shares of Illinois stock to Boon-Strachan. The latter would be operating and sales company for the new arrangement.

Illinois Zinc produces strip and sheet zinc. Its mining interests are in New Mexico where it recently reopened the Kearney zinc mine near Silver City, and in Arizona where its subsidiary Shannon Mining Company is reopening the Shannon mine near Tombstone. Canadian Javelin has undeveloped iron ore and titanium properties in Labrador and Ouebec, and iron ore mines in Chile.

Another Aluminum Plant Planned for Norway

Norway will have another new aluminum plant! A/S Elektrokemisk of Oslo has announced plans to build a 20,000-ton-per-year plant at Mosjoen in Norland province, northern Norway, with operations to begin in 1957.

Total Norwegian aluminum output in 1954 was 56,000 tons, and should amount to about 100,000 tons this year when the new Sunndalsora plant is in full production. The Mosjoen plant, now planned, would increase that amount by another

would increase that amount by another 20 percent, or 20,000 tons.

The hydroelectric plant at Rossaga will have to be expanded to provide for the additional 50,000 kilowatts of power required. The Rossaga plant has been developed to provide power for the big new steel plant at Mo i Rana. Next year the power plant will have an installed capacity of 120,000 kilowatts, but most of this is scheduled for the steel plant and the remainder for local use. There is provision, however, for installing three more generating sets, each to give 30,000 kilowatts.

Algom, Rio Tinto Sign For Uranium Development

In one of the most important financial arrangements to be completed in Canadian mining, Algom Uranium Mines, Ltd. and Rio Tinto Ltd. have signed an agreement which assures large-scale production for two uranium properties in the Blind River district of Ontario.

The agreement provides for about

The agreement provides for about \$41,000,000 to bring the Quirk Lake and Nordic Lake properties of Algom into production, on the basis of a "letter of intent" from Eldorado Mining & Refining Company Ltd., official Crown purchasing agent, for the delivery of \$206,910,-

000 in uranium oxide concentrate for a period of five years. Rio Tinto will have technical management including the right to negotiate sales contracts. In addition to the assured \$41,000,000, warrants make possible another \$16,500,000 if needed.

Plans call for a 3,000-ton mill at each of the properties. Production date for the Quirk property is June 1956, and the schedule for the Nordic calls for initial milling by January 1957. Initial building supplies are already flowing in, with foundations to be built as soon as spring weather permits. Sinking of five-compartment shafts capable of sustaining the 3,000-ton mining rates is in progress at both properties.

Sydvaranger To Drain Lake For More Iron Ore

A/S Sydvaranger, which operates Norway's largest and northernmost iron ore works, located at Kirkenes, will drain the nearby Björnevann lake to make several more million tons of ore accessible for mining. Preparatory work has already been started on a five-mile conduit to connect the lake with Langford. Since the war, surveyors have made some 10,000 diamond borings to determine the extent of the Björnevann deposit.

Farther south, in the Dunderlandsdalen valley of North Norway, the company has ascertained the existence of very extensive iron ore fields by making altogether 45,000 borings. The Dunderland deposits are believed to be even larger than those in Svdvaranger.

The only company in the world as yet to mine magnetic taconite on a commercial basis, A/S Sydvaranger presently employs about 1,000 workers. Since operations were resumed in April 1952, the plant has produced about 1,800,000 tons of ore concentrate, valued at 160,000,000 to 170,000,000 Krone. (MINING WORLD devoted the entire issue of October 1953 to a report on A/S Sydvaranger and its operations.)

Construction of the company's first pelleting unit, to have a capacity of about 150,000 tons a year, will get under way this spring. Eventually, A/S Sydvaranger hopes to export some 500,000 tons of iron ore pellets annually.

Canadian U₃O₈ Plant May Open Ahead of Schedule

Production at the Gunnar Gold Mines, Ltd., uranium plant at St. Mary's Channel in Athabaska, Saskatchewan, Canada may begin before the September starting date originally announced by the company. Construction and equipment instalation at the project are ahead of schedule, and it is believed that the facilities will be able to handle more than the planned 1,250-ton-per-day rate.

The sulphuric acid manufacturing

The sulphuric acid manufacturing plant is expected to begin operations in April in order to build up a supply for the uranium ore leaching process. The main Diesel-generator power supply plant was completed in February, and the mill building has been closed in, with efforts now centered on machinery installation. A townsite has been started at the mill with employe bunkhouses already built and 24 single dwellings to be completed by spring.

Battelle Has New Process For Rare Earth Recovery

A new process for the recovery of thorium and the rare earth metals from monazite sand has been developed by scientists at Battelle Institute in a research project sponsored by the U. S. Atomic Energy Commission. The process is reported to be simpler than present processes and may be a factor in the development of new markets for these metals.

Monazite sand is one of the most important sources for thorium and the rare earths. The best known deposits of monazite are the beach sands of Brazil and India, but there is some monazite in Florida and Idaho and in other parts of the United States. The search for better methods of recovering thorium and the rare earths from their ores has been stimulated over the past ten years by the possibilities of sizeable new markets in the atomic energy, metal, and electrical industries.

Chemically, monazite sand contains principally phosphates of the rare earths and thorium. The sand is up-graded by ore-dressing methods to produce the concentrates, which are processed chemically. The conventional process, used by the rare earth industry in the United States, satisfactorily breaks down the monazite sand through treatment first with sulfuric acid and then with water. The resulting solution, however, contains nearly all the phosphate in the sand. The presence of the phosphate seriously complicates the recovery of thorium and the rare earths.

The new process treats the monazite sand first with sodium hydroxide and then with hydrochloric acid. These recovery agents permit removal, at an early stage, of the phosphate present in the sand. Thus, subsequent separation and purification of thorium and the rare earths is greatly simplified. The new process has been carried out on a small pilot-plant scale.

Australian Aluminum Plant in Production

Australia's first aluminum plant, on the banks of the Tamar River at Bell Bay, Tasmania, began production on February 7, when the alumina section went into operation. When it reaches full production rate later this year, it will turn out 10,000 tons of aluminum ingots annually.

Initially, the plant will produce alumina; aluminum will be manufactured when enough alumina has been prepared, probably by mid-year. Bauxite from Malaya is now being used, and eventually Australian bauxite will be used.

The \$22,250,000 plant is the only one in the southern hemisphere, and one of the few in the world which will combine all stages of aluminum production in one integrated process. Erection of a prefabrication plant is planned in due course so that metal may be supplied to consumers ready for use. A new private company, Southern Aluminum Ltd., has already begun rolling of aluminum shapes in Sydney, New South Wales, and will welcome metal from Tasmania. An older firm is Australian Aluminium Ltd. also at Sydney.

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SPAIN—Minas de Almaden is considering the installation of a second quick-silver furnacing unit similar to one purchased in the United States in 1952 from the Pacific Foundry Company of San Francisco. The present unit has a capacity of 200 tons of ore daily; the additional unit would increase this capacity to 400 tons of ore daily, or 120,000 tons annually. However, this is a theoretical capacity which may not be met for mine output has been a limiting factor. A second new shaft is planned, but the geological structure is difficult. A shaft started a year ago has only been sunk 200 meters and it may be another year before the vein is contacted at 400 to 500 meters.

SWEDEN — Luossavarra-Kiirunavaara has started operation of its huge new ore storage and transport plant at Narvik, Norway, which includes provisions for receiving, crushing, and storing 4,000 tons of ore per hour. Unloading can be carried out simultaneously at the same place. The ore will arrive at Narvik already crushed to shipping size, because of the installation of five giant crushers at the company's underground mines at Kiruna and Malmberget. The ore is also classified according to phosphorus content in the ore cars.

SCOTLAND—The Siamese Tin Syndicate Ltd. is giving serious consideration to recommendations of its consulting engineer, Donald Cill, that the company proceed with development of the Lowland lead mines at Lead Hills, Lanarkshire. The firm had explored the mines in partnership with Rio Tinto Company for the past four years. Rio Tinto withdrew from the project last fall. During the exploration period, the old mine had been unwatered, and extensive geological and geophysical surveys made at a total expenditure of about £250,000; Siamese Tin's share of this is about £153,000. The proposed development and production work would be based on extracting the estimated ore reserve in sight, and probably handling certain accumulations of old tailing from very ancient workings at surface.

FINLAND—Blocks of gneiss have been found at Lavia in southwestern Finland containing gold—about 16 grams per ton—silver and some wolframite. The size of the deposit is not yet known.

SARDINIA—It is reported that E.N.I. (an Italian government agency) will soon be given a monopoly on exploration for uranium in Sardinia. Operations are scheduled to begin shortly, according to the report, at an initial cost of 700,000,000 lire.

ENGLAND—South Crofty Ltd. has purchased the plant of the old Mount Wellington mine. Plans are to use the tables and other equipment along with some other equipment in modernizing and expanding the treatment plant. The firm sold 57.5 tons of tin concentrate in December, and 55.5 tons in January.

NORWAY—The first iron blast furnace at the new steel plant being erected by the Norwegian government at Mo i Rana will go into operation this month—18 months later than expected. Full capacity operation is anticipated by the end of the year. All three furnaces are expected to be working by August, with full capacity operation anticipated by the end of the year. Total cost of the new plant, which is located north of the Arctic Circle, is £23,000,000. In its initial stage it is planned to produce about 200,000 tons of rolled steel products annually. A British engineer, Rhys Jones, has been appointed manager of the rolling mill department. Steel plant director is Bostrup Muller, who says that 20 key workers will be sent to Britain for a special six-week training.

FRANCE—The Centenary Congress of the Societe de l'Industrie Minerale will meet in Paris from June 20 to July 3. Included on the program are an exhibition of equipment covering the whole field of mining and metallurgical industries, iron and steel sessions, mining sessions, and visits to French industrial plants for those foreign members, and upon their request. For additional information, contact General Secretary's Office for the Congress, 60, boulevard Saint-Michel, Paris 6°.

AUSTRIA-According to the unrevised figures issued by the Austrian "Supreme Mining Authority," a branch of the Ministry of Trade, the 1954 ore production figures in metric tons were as follows: iron ore 2,720,000; lead-zinc ores 164,700; copper ore 174,655; bauxite 17,266, magnesite 839,000; and antimony 10,065. All sectors of the mining industry re-



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ported increases, except for the iron ore section, where the 1953 level of 2,757,-000 tons was not equaled.

CZECHOSLOVAKIA—Geologists have mapped the entire territory of Czechoslovakia during the past four years. One of the first actual successes of this mapping was the recent start of iron mining operations near Jesenik, where a new shaft is currently being sunk. Technicians and miners from the nearby Kutna-Hora iron ore mine have sunk the shaft about 350 feet so far. This new mine, which is expected to yield some production in 1955, is located in northern Moravia.

POLAND—The first Polish aluminum plant, located in Kracow district, started operations recently. Named the Skawina plant, it is claimed to be one of Europe's most modern production units. The Soviet Union blueprinted factory plans and delegated experts to supervise installation of Soviet machinery and direct production. The bauxite is said to be coming from Hungary.

AUSTRIA—The largest Austrian iron ore mining company, the Alpine Montan A.G., reached a production of 2,710,000 metric tons of iron ore, 12.8 percent more pig iron (477,470 metric tons), and 20 percent more raw steel (738,700 metric tons) than recorded during 1953. The oxygen converter department, started up in May 1953, yielded 226,000 metric tons of steel of open-hearth quality during 1954.

FRANCE—The following important sources of fissionable materials have been developed in France and the French Union, according to "France Actuelle." Lachaux (Puy-de-Dome)—deposits of an early find are now almost exhausted, but wide prospecting in this area is still going on. One pitchblende find was made in 1946 in the Bois-Noirs region and this is expected to provide a considerable part of France's production by 1956. LaCrouzille (Limousin)—The first good pitchblende layer was found here in the Henriette mine in 1948. The whole area is said to contain numerous evidences and deposits, some of which are already in production. Grury (Saone-et-Loire)—One low-grade mine in operation which may begin large-scale production by means of a chemical-treatment process in the near future. Vendee—This mining division was created in 1954. Two low-grade deposits near Clisson and Mortagne-sur-Sevre may become important if the chemical-treatment process is used. In 1953 significant resources of thorianite were discovered near Fort Dauphin on the island of Madagascar.

POLAND—Zinc will be mined from the Chrzanov mine, idle for the past 16 years. The mine was flooded in 1945, but has since been dewatered. Construction crews have secured the inner walls and excavations, have cleaned the mine of sand. Since December 1954 the mine has been in operation, and a second shaft has been started.

HUNGARY—The steel mill industry is worried because of the insufficient yield of manganese mines. At the *Urkut* mine 2,838 metric tons of ore were "owed to the state" because the mine was that amount short of the production plan. Reason for the slow production is lack of workers and the high absenteeism of miners.

U.S.S.R.-The mining center of Norilsk in northern Siberia appears to be having a boom although the cause of it is not revealed. According to the "New York Times," a former slave laborer reported that newly developed secret uranium mines are being operated there. The former prisoner, Count Robert Von Butlar-Brandenfels, said that at least 120,000 prisoners had been shipped there to work in the mines, and that the area is in-accessible except by air for nine months of each year. Only in the three summer months is it possible to move the uranium to Soviet atomic projects. Redistricting election data published recently list Norilsk as a centrally administered unit and allot it a separate election district. Election districts in the U.S.S.R. usually have a population of about 150,000 persons. In the last elections in 1951 Norilsk was not listed separately and was included as part of the Tamyr area.

NORWAY—The *Titan Company* is currently re-examining its extensive ilmenite deposits at Jossingfjord. Due to be completed in another seven or eight months, the survey hopes to determine whether Norwegian titanium will be able to compete on the world market. The production would eventually be based on an electrolytic process not used in any other country so far. Containing only about 20 percent pure titanium, Norwegian ilmenite is used to produce titanium dioxide for manufacture of paint. The country's production of ilmenite concentrate containing 44 to 55 percent titanium dioxide, has increased from 50,000 tons in 1938 to 128,000 tons in 1938. Norsk Hydro, Norway's largest chemical manufacturing plant, is also considering production of valuable titanium metal. One factor is development of the 200,000-kilowatt hydro power potential in the Suldal-Roldal watershed on which the company has an option.



UNION OF SOUTH AFRICA-Vaal Reefs Exploration and Mining Company Ltd., employing hand-mucking methods, achieved an advance of 590 feet during January in the sinking of the vertical ventilation component of the No. 1 twinshaft system. This established a world record for hand mucking. The component is circular, 18 feet in diameter. The advance of 597 feet (world record) accomplished last June in the No. 2 shaft of the Merriespruit (O.F.S.) Gold Mining Company, Ltd. was achieved through the use of a mechanical grab mounted from a multi-deck stage.

SOUTHWEST AFRICA-Industrial Diamonds of South Africa (1945) Ltd. has started mining operations in the recently discovered diamond-bearing marine terrace at Saddle Hill North in the Luderitz district. Trial washings have yielded diamonds of a very fine quality.

ANGOLA-Production of diamonds in 1954 exceeded 700,000 carats.

FEDERATION OF RHODESIA AND NYASALAND—New funds totaling £2,600,000 are to be raised by Messina (Transvaal) Development Company, Ltd. in order to bring into production the Mollie section of property held by Rhodesia Copper Ventures at Sinoia,

Southern Rhodesia. Estimated cost of the program is £4,300,000. Ore reserves presently indicated are about 16,370,000 tons averaging slightly more than 1.6 percent copper. Messina, which owns 79 percent of Rhodesia Copper's share capital, plans to have this section producing at the rate of 2,000 tons of ore a day by 1959.

UNION OF SOUTH AFRICA—The Montrose Exploration Company, Ltd. recently purchased the surface and mineral rights of the farm Hendriksplaas 357, Lydenburg district, on which chrome mining operations had been in progress for some time on a royalty basis. The company is also financing the opening up and development of tin prospects in the Potgieterust district.

NIGERIA—As a result of further drilling, there has been a substantial increase in the proved and partially proved ore reserves of *Tin and Associated Minerals*, a tin-columbite producer. The new progress report of the company's technical consultants now estimates the total of fully proved gravel at 1,310,000 cubic yards, averaging 3.31 pounds of columbite per yard, compared with the previous estimate at the end of last year of 730,000 cubic yards averaging 3.21 pounds. Drilling is continuing and with the introduction of a power drill in the near future, ground will be tested to considerably greater depths than before.

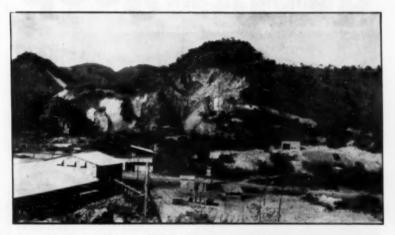
BELGIAN CONGA-In 1954 Union Miniere du Haut Katanga produced 223,-750 tons of copper, compared with 214,-116 tons in 1953. Cobalt production amounted to 8,540 tons compared with 8,278 tons in the previous year. Minor production results, such as in silver and cadmium, were at about the same level as in 1953. Uranium output was not revealed. The first quantities of germanium oxide have been placed on the market.

UNION OF SOUTH AFRICA-Africair, a subsidiary of General Mining and finance Corporation, has applied for permission to transport by air each month a cargo of eight tons of enriched platinum matte from the Rustenburg mines to Durban for shipment to London.

FEDERATION OF RHODESIA AND NYASALAND—One of the larger gold producers in Southern Rhodesia, the Rezende Mincs Ltd. near Umtali, is suspending operation and closing down because of increased pressure bursts in depth. Since the start of mining operations early in this century, the mine has produced over 1,000,000 fine ounces of gold, and had paid up to 1951 over £ 1,100,000 in dividends. The mine workings have reached the 16th level. Approximately 6,400 tons of ore were crushed per month in the 40-stamp mill. The ore contains approximately 4.5 dwt. gold per ton. The production for the first 10 months in 1954 amounted to over 10,814 ounces of gold.

MOROCCO—It is reported that many manganese mines of the Quarzazate area will either curtail or completely stop production because of the decline last year in world prices. Despite tax reliefs granted by the government, production and transport costs are higher than the market price. In 1953 Morocco produced 240,000 tons of manganese ore for the steel industry, and 54,000 tons for the chemical industry. In the first eight months of 1954, output was 240,000 tons and 31,000 tons, respectively.

UNION OF SOUTH AFRICA—During the past year, the expansion program of the Potgieteersrust Platinums Ltd. has fulfilled all expectations. The rate of crushing has been increased from 300,000 tons in 1946 when only the Rustenburg mine operated under their control, to approxi-



Blasting Asbestos Ore from Rhodesian Open Pit

A systematic deep diamond drilling program is being carried out at the Ethel mine of Ethel Asbestos Mines Ltd. near Salisbury, Southern Rhodesia, to prove the downward extension of the chrystofile asbestos are bodies. Ore breakage in the 1,200-feet-long, 250-feet-wide, and 100-feet-deep open pit was carried out largely by diamond drill ring-blasting producing up to 3,000 tons per blast. In the photograph above a blast has just been fired in the pit and dust can be seen beginning to rise. Recently underground stoping was substituted for open pitting on the first and the newly developed second levels. The annual production amounts to nearly 1,200 tons of long-grade chrysettle asbestos, and consideration is being given to ways of doubling this figure. The Ethel asbestos deposit is located an Southern Rhodesia's Great Dyke in the Umwukwe, following a vertical major cross fault offsetting the Great Dyke from east to west for about half a mile.

mately 1,500,000 tons in 1954 from the Rustenburg and Union mines combined. The quantity of platinum sold in 1954 was five times as great as that sold in 1946, and Rustenburg Platinum Mines Ltd. now ranks as the largest single platinum producer in the world. The Waterval (Rustenburg) Platinum Mining Company announces, that notwithstanding the persistent Russian offers, the demand for platinum throughout 1954 absorbed all of the mine's output.

SOUTH WEST AFRICA—At the mine of Tsumeb Corporation Ltd. between 45,000 and 50,000 tons a month of copper-lead-zinc ores are being milled and treated in the flotation plant. The recovery consists of copper-lead concentrates and zinc concentrates. These are railed to Walvis Bay, where they are loaded for shipment overseas by means of the corporation's mechanized loading plant. This operates at the average rate of 325 tons per hour. It has effected a marked reduction in the turn-around time of the ore-carrying ships and has considerably eased the shipping congestion in Walvis Bay. Lower level development in the Tsumeb mine is making rapid progress on the deeper 2tth, 27th, 28th, 29th and 30th levels. On these, headings are being driven from the De Wet shaft to the ore body, and a connection is being effected with the No. 5 interior winze, sunk from the 24th to the 30th level about two years ago. A pumping station, capable of transferring 4,000 gallons a minute from just below the 30th to the 24th level, has been completed and is in operation. A new high pressure boiler

and turbo-generator unit are being installed in the electric power plant. These will increase the plant's total steam generator capacity by 4,000-k.v.a. to 11,000-k.v.a. and thereby permit the Diesel generators to be used as standby only. For a little more than a year the corporation has been conducting in its own laboratories and ore-testing department an intensive research program on the recovery of germanium from the copper-lead concentrates. Both flotation and chemical extraction methods have been employed. Simultaneously, research on the Tsumeb ores has been advanced in both United States and Belgian laboratories.

FEDERATION OF RHODESIA AND NYASALAND — The American Metal Company, Ltd. is sponsoring a scholarship in memory of the late Norman Hickman to encourage students from the Federation to attend Yale University. The scholarship is worth \$4,200 and is for one year although in special cases it may extend to a two-year period. The scholarships will be awarded without regard to race to men and women who have themselves resided in, the Federation for at least three years during the five years ending on December 31 of the year of application. The purpose of the scholarship is to promote better understanding between the United States and the Central African Federation. There is no limit to the field of study other than the availability of such study at Yale, Mr. Hickman, a graduate of Yale in 1912, was for many years a director and officer of the Ameri-

can Metals Company, Ltd. in New York

NIGERIA—The report of the World Bank's mission to Nigeria, undertaken at the request of the governments of Nigeria and the United Kingdom, has now been published. It states that one of the two major obstacles to development of the Colony is the lack of knowledge of its resources and this can only be overcome by further research and surveys. The mission points out that the two essentials for a development program—manpower and funds—are available. Industrial expansion should be actively encouraged and the mission proposes the early creation of a State Bank of Nigeria. To finance the program, the mission recommends capital expenditures by the two governments and local authorities increasing from £21,000,000 in 1955-1956 to £35,000,000 in 1959-1960. The mission believes this to be within the limits of Nigeria's financial resources.



LATIN AMERICA

CUBA—A law recently passed to spur mining in the country is now the center of a dispute between factions of the industry and government officials. Basically, the law levies fees on owners of mining concessions who do not develop these concessions. Opponents of the law claim that this hurts the owners of small mines, because if for any reason they are unable to develop their mines or pay the fees, then the government will expropriate the mines. Defenders of the law argue that if a person does not want to develop a property because he does not find the mineral commercially exploitable, then why should he want to maintain a concession which is of no use to him. Also if the mineral exists in quantity and he is waiting for better prices, why shouldn't he pay minimum obligations to the state in order to maintain his concession.

PERU—A reduced demand for iron ore in the United States has caused Marcona Mining Company to reduce shipments from the southern Port of San Juan, Peru during the last few months. Current shipping is about 120,000 tons per month, peak operations in the past have been as high as 200,000 tons per month. The company has shipped more than 2,800,000 tons since it started operations April 20, 1953. The Peruvian government royalty on tonnage is 6 percent up to 1,000,000 tons, and 7 percent over that 'amount. Exploration is still continuing. Mining shifts have been consolidated into one operational shift and one maintenance shift with personnel working a six-day week. Marcona is a joint operation of the Utah Construction Company and Cyprus Mines Corporation.

MEXICO—An iron and steel plant is planned for Ensenada, Baja California, according to David Ojeda, Mayor of Ensenada, and Oscar Senson, prospective owner-manager of the enterprise. The plant will first use scrap material obtained in the local area, but later plans to operate with ores mined in the Ensenada municipality. Crude oil or natural gas will be the fuel since either one is reported to be cheaper than coke in this vicinity.

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ARGENTINA — The Volcan Overo mine of Sociedad Minera Argentina (SOMINAR) is expected to increase sulphur output to 50,000 tons a year by 1956 when new refinery equipment is in operation. The mine now produces about 20,000 tons of sulphur a year. The new equipment is to be installed this summer at a site about 10 miles down the mountainside from the mine. The mine itself is at 18,000 feet on the Volcan Overo volcano. Because of the severe weather conditions, mining can only be conducted for about 90 days during the year.

VENEZUELA—The Montecatini Company of Italy has concluded an agreement with the Venezuelan government for the construction of a plant in Venezuela which will manufacture nitrogen and phosphate fertilizers. The plant will operate as an independent enterprise, making 30,000 tons of synthetic nitrogen per year from natural gas which will be turned into 80,000 tons of ammonium nitrate and ammonium sulphate. The plant will also produce annually 18,000 tons of urea, 20,000 tons of P₂O₈ which will yield 100,000 tons per year of superphosphates, and certain amount of concentrated nitric acid and oleum. An agreement has also been reached with the Colombian government for construction of fertilizer plants at Barrancabermeja.

HAITI—A wholly owned subsidiary of Consolidated Halliwell Mines Ltd. of Canada, Haitian-American Minerals Corporation, will diamond drill a 336-square mile concession in the northwestern part of Haiti to determine the tonnage and grade of copper-gold-silver ores. These minerals had been disclosed by a preliminary inspection of the property. The copper showing is in the Meme Valley of the Terre-Neuve district.

BRAZIL—Usina Aco-Belga Mineira de Monlevade is preparing to double production of its steel plant in Minas Gerais. The engineering firm of Christien Nielsen is building the new section. Scheduled to start operations next year, it will have an annual capacity of 150,000 tons, providing the firm with a total production of 350,000 tons by 1956. The Export-Import Bank has authorized a credit of \$730,440 to build the new plant.

MEXICO—The Mexican government has decided to work the rich Las Truchas iron ore deposits in Michoacan for the benefit of the country's heavy industry. First step will be the establishment of a hydroelectric plant at El Infiemito which will generate 600,000 kilowatts. This plant will play a major role in developing the deposits which are estimated to contain \$5,000,000 tons of ore. Also planned is construction of a port on the Pacific coast of Michoacan to provide easy shipment of ore.

CHILE-The Chilean Ministry of Mines has announced that the Anaconda Copper Mining Company's Africana mine near Santiago will shortly be in operation producing 20,000 tons of copper concentrate annually.

CUBA-A plan to exchange Cuban strategic materials, such as manganese and nickel, for United States Food products, was discussed recently by Arthur A. Brevaire, vice president of Metallurgical Research & Development Company, Inc. of Washington, D.C., and Cuban President Andres Domingo y Morales del

Castillo. The food products would include wheat and rice which the U.S. government has stored under its farm subsidy systems.

BRAZIL—A trade agreement has been signed with Poland for the exchange of goods amounting to \$16,000,000 (agreement dollars), half to be supplied by each country. Brazil will send \$2,200,000 worth of iron ore and \$4,000,000 worth of agricultural commodities. Poland, in turn, will export \$800,000 worth of agricultural machinery and parts, \$700,000 worth of machine tools and other metal-working machinery, \$500,000 in oil rigs, coal mining and other mineral ore mining machinery, \$200,000 in x-ray plates, \$100,000 in zinc oxide, \$50,000 in elect-trodes and battery carbons, in addition to other products.

MEXICO—Construction of a five-milelong canal to facilitate iron ore movements to the Pacific Coast from the Las Truchas deposit in Michoacan is planned by the Ministry of Hydraulic Resources. The Ministry estimates this deposit to contain 900,000,000 tons. It considers marine moving cheaper than overland in getting this ore to smelters and other treatment plants.

BRAZIL—After two years of study, the Joint Brazil-United States Economic Development Commission has released its report of ways and means for developing Brazilian economy. Forty-one projects were elaborated and recommended by the Commission which attempted to stress only those projects of the highest priority in order not to overburden the country's balance of payments. Two projects would

be of note to the mining industry—the National Caustic Soda Company, and the Barbara steel plant.

ARGENTINA—Benefits of the "new investments" law passed in August 1953 are now being extended to "old investments" provided they are declared to be in "national interest" industries. The 1953 law was passed to stimulate new capital in the country, and gave foreign investors the right of remittance abroad of up to eight percent annually and repatriation of the original investment by installments after 20 years. The new decree accords these same benefits to old investments which for many years have been denied permission to remit profits. So far, only mining and certain basic industries will benefit.

MEXICO—A plan to increase Mexican steel production is being considered by the Ministry of National Economy. Most steel that Mexico now uses is imported, largely from the United States and West Germany. Lack of sufficient electric power is cited as the principal reason for not being able to make enough steel to meet the steadily increasing demands of expanding industries. Highlights of the plan are to increase electric power supplies and to facilitate prompt and adequate deliveries of iron ore and coal to iron and steel works, An important iron ore deposit has recently been discovered at La Huerta near Guadalajara by mining engineers, Adrian Esteve Totti and Marcos Perez Gonzales. The discovery is being checked by the National Institute for the Investigation of Mineral Resources.

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OCEANIA

REPUBLIC OF THE PHILIPPINES—Palawan Quicksilver Mines, Inc., a new mining corporation formed with Filipino and United States capital, expects its new plant to be completed by June, after which it will start immediate operation. Capable of handling 100 tons daily, the plant will treat an average of 2,500 tons of quicksilver ore per month with an estimated production of at least 200 to 250 76-pound flasks of quicksilver. The plant uses a rotary type furnace, and was purchased from Gordon I. Gould & Company of San Francisco, California. These commercial deposits of mercury, located in barrio Tagburos, Puerto Princesa, Palawan province, are the first quicksilver mines to be developed in the Islands. First reports of the discovery were carried in Mining World, January 1955, page 37.

SOUTH AUSTRALIA—Heavy medium concentration using ferro-silicon is working satisfactorily at the Radium Hill concentration plant. This is the first application of heavy media processes in Australia to minerals other than coal. It is probable that the process will be introduced at Mt. Isa for oxidized lead-zinc ores and at Norseman Gold Mines N.L. at Norseman in Western Australia for

pyrite. The treatment plant at Port Pirie for processing Radium Hill concentrate is expected to operate within a month or two. Provision has been made to deepen the Radium Hill shaft to 2,000 feet (present depth is 750 feet). Known limit of the ore body is 1,500 feet but further exploration should exceed this.

INDONESIA-Uranium is reported to have been found in the Schwaner and Muller Mountains of Borneo, about 25 miles east of the oil center at Balikpan.

REPUBLIC OF THE PHILIPPINES—Production of copper concentrates by Atlas Consolidated Mining and Development Corporation at its Toledo mine in Cebu has started after completion of the 4,000-ton copper flotation mill. The company now announces that it plans to construct a sulphuric acid plant in the same locality to use 100 tons daily of the pyrite produced as a byproduct of the copper plant. The balance of the pyrite will be sold to fertilizer plants in the Philippines, or to Japan, Formosa, Korea, and Borneo. Also planned is a plant for producing 55 tons per day of superphosphate fertilizer from the sulphuric acid. The remaining sulphuric acid will be absorbed by local industries which import 10,000 tons annually.

QUEENSLAND-Titanium and Zirconium Industries plans a \$1,125,000 expansion of its beach mining activities off the coast of Queensland. An aerial tram will be constructed to travel the two-thirds of a mile from Stradbroke Island

to the coast, delivering 30 tons of concentrate per hour to treatment units. Also planned are a larger separation plant, a new Diesel power station of 1,500-kilowatt capacity, and erection of a small town for the staff.

INDONESIA—According to the head of the Djawatan Perindustrian of Tjirebon (Java), 200 different raw materials are found in this province: gypsum, marble, calcareous spar, are a few. Until now, mining of limestone was the most important, with 100 kilns in operation producing about 55,000 cubic meters valued at 5,000,000 rupees annually. In 1950 only 40 kilns were in operation producing 28,000 cubic meters valued at 1,834,000 rupees.

QUEENSLAND—Australasian Oil Exploration Ltd. is pressing forward with exploratory work on its Mary Kathleen ore body at Mt. Isa. No. 3 drill hole intersected four lodes with a total width of 67 feet. No. 4 hole has entered ore at a depth of 13 feet. A number of rare earths have been identified in cores examined by the South Australian Mines Department on behalf of the company. Good values of cerium-lantianum oxides and yttrium-erbium oxides are indicated. There seems little doubt at this stage that the Mary Kathleen area is of considerable importance, but time and considerable capital expenditure will be required before prospects can be fully predicted.

WESTERN AUSTRALIA—Gold Mines of Kalgoorlie (Aust.) Ltd., which recently acquired the shares of South Kalgurli Consolidated, Boulder Perserverance Ltd., and Kalgoorlie Enterprise Mines, has now called for capital to finance mill extensions to 38,000-tons per month. The acquired companies have leases adjoining those of G.M.K., and it is expected that economies and increased efficiencies will arise from the merger. South Kalgurli and Boulder Perserverance were English-controlled companies. By mergers of this kind, companies with adjoining areas are endeavoring to overcome tendency for costs to rise continually.

PHILIPPINE ISLANDS—Three Japanese steel firms—Fuji Iron & Steel Company, Yawata Iron & Steel Company, and Nippon Steel Tube Company—have accepted financial proposals of the Philippine Iron Mines for the installation of a beneficiation plant in Larap, Camarines Norte. This is expected to enable Philippine Iron Mines to expand its output and to bring within the commercial ore horizon several million tons of iron ore which until now had not been of commercial

AUSTRALIA — The Commonwealth government has approved a Tariff Board recommendation for assistance to the sulphuric acid industry. A bounty will be paid on sulphuric acid produced from pyrite for five vears, dating back to Iuly 1, 1954. The bounty will be limited to £A600,000 per year, and will not be paid to raise a producer's net profit above 12½ percent of the capital used in producing and selling acid. During recent years, there has been great expansion in the Australian sulphuric acid industry, and this expansion is continuing. Plants for burning local pyritic concentrate were constructed to overcome a projected world shortage of elemental sulphur and now that this situation has eased, possibly temporarily, cost of using pyrite has necessitated some government assistance.

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PHILIPPINE ISLANDS—Agriculture Secretary Salvador Araneta has approved the lode lease contracts applied for by Gold Coast Exploration and Development Company and the Philippine Iron Mines. The contract with Gold Coast covers mineral land claims containing gold and other minerals located at Sapa, barrio of Masara, Davao. The area covers 18,000 hectares of unreserved and unappropriated mineral land. The contract with Philippine Iron involves a land area of more than 51 hectares, covering mineral claims containing iron ore in the barrio of Larap, Camerines Norte.



THAILAND—A new firm is to be formed by the Mitsubishi Metal Mining Company and the Mitsubishi Trading Company, both Japanese companies, to operate the Chang Phra tin mines in southern Thailand. The Siamese will furnish the mining rights and other local facilities equal in value up to 51 percent of the capitalization, (capitalization is \$575,000) and the Japanese firms will provide the machinery and other equipment. The mines are located near the east coast on the narrow neck that connects Thailand with the Malay Peninsula. The new company hopes to produce 48 tons of 72 percent concentrate per month when it gets under way. Japan presently imports about 250 tons of concentrate per month from foreign countries, mostly Malaya, and the new company is expected to reduce Japan's dependence upon Malaya.

MALAYA—A new million dollar firm reportedly will be formed with British, Malayan, and Japanese capital to mine iron ore from the Temangan mines in Kelantan. The British and Malayan firms—Messrs. Andrew Weir & Company, Ltd. and Messrs. Boustead & Company, Ltd.—will hold 51 percent of the shares, while the Japanese firm—Kokan Kogyo Company of Tokyo—will have 49 percent of the company. Operations are expected to start about the middle of this year.

BURMA-Burma Mines. Ltd. is beginning to show results after heavy investments in capital equipment. Ore extraction is approaching capacity of the existing concentrating plant and an additional one is planned. Output of refined lead jumped to 9,081 long tons last year from 3,740 in 1953. Silver production, refined and crude, rose to 863,085 fine ounces from 405,914. Zinc concentrates amounted to 9,558 tons, an increase over 5,000 tons in 1953. Crude copper rose to 154 tons from 65; only crude nickel dropped, from 171 to 161 tons.

JAPAN—The exploration work performed by the Oppu Mining Company in the Oppu copper mine has confirmed promising resources; recoverable reserves of copper, lead, zinc, and pyrite ore are estimated at 1,000,000 tons. The Oppu Mining Company was set up by the Akayama Mining Company, with the financial assistance of the Mitsubishi Metal Mining Company. Akayama had acquired the Oppu mine in 1950 from the Tohoku Mining Company. A 150-ton mill was completed at the property in September 1954.

MALAYA—Malayan Tin Dredging, Ltd., with headquarters at Batu Gajah, Perak, is undertaking the prospecting for tin off the coast of Selangor. Work is to be carried out by the Messrs. Vallentine and Dunne of Kuala Lumpur, a firm of consulting mining engineers and surveyors. The plan is the second of its kind to be attempted in the Federation since the war. About two years ago the same two firms were engaged in underwater prospecting off the coast of Malacca. The results were not promising, and no further action was taken. Licenses for the Selangor prospecting have been issued and the work will start soon. A 130-square-mile area stretching from the Negri Sembilan border north to Port Swettenham will be checked.

AFGHANISTAN—The government is reported to be taking steps to develop mining of nonferrous ores in the country. Two mining experts, W. Mure and a Mr. Hogg of a British metal firm, are visiting Kabul on the invitation of the government to have preliminary talks in this connection.

PAKISTAN—The Pakistan Mine Owners Association has decided to ask the government to set up a Bureau of Mines which would coordinate the various departments with which mine owners have to deal in regard to their mining projects. The association also called for the encouragement of export of minerals and for the necessary facilities to import machinery and other equipment for developing the mines. Officers elected for the

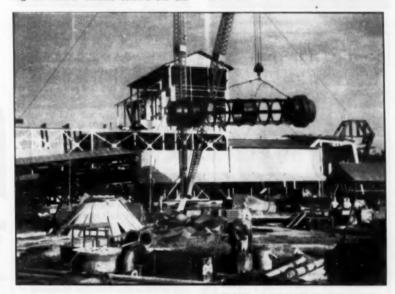
1955 year are Yusof M. Chinoy, president, and Chaudhri Abdul Karim, secretary.

JAPAN—A spokesman for Nichimen litsugyo Company reports that Communist China had offered 20,000 tons of iron or mines in Chinlingchen mine near Tsingtao, Shangtung province, for trial imports at \$7.77 per metric ton. Freight costs would add another \$3.00 per ton. Iron content was about 57 percent. Another trade firm, Nissho Company, received an offer from China of 50,000 tons of iron ore mined in Hainan Island for trial imports at \$8.93 per metric ton. Freight cost would be about \$5.50 per ton. Iron content of this lot is about 58 percent.

PAKISTAN—About 5,000 tons of crude gypsum will be shipped to Ceylon to help in the manufacture of cement at the government factory in Ceylon.

MALAYA—The Pan-Malayan Scientific Advisory Council has set up a technical committee to assist the mining industry with scientific and technical information. It will serve both private and public interests for the fullest and most efficient development of Malayan minerals, and will serve as a clearing house for all matters pertaining to minerals and mineral resources. Members are J. T. Chappel, Professor E. H. G. Dobby, E. A. Fisher, G. F. Gripper, H. W. Hickin, Colonel H. S. Lee, Harold Service, and H. J. Tillia.

KOREA-The United States government has invited Korean scientists to



Pre-War Malayan Dredge Back in Operation

Austral Amalgamated Tin Limited has completed reconstruction of its Sungkal dredge at Sungkai in Lower Perak, Malaya, and it is now in operation. In the photograph above, taken during the reconstruction period last fall, a trommel screen is being hoisted aboard by a stiff-leg crane. The dredge was first commissioned in Malaya in 1920, and operated in the vicinity of Taiping, Perak, until the Japanese Occupation. It was completely dismantled during the occupation period. Later, when the company returned to the area, it was not considered economical to rebuild the dredge because the Taiping tin ore reserves were almost exhausted. The company eventually secured a suitable location at Sungkai in Lower Perak and the dredge has now been moved, rebuilt, and modernized. Its maximum digging depth is 46 feet, and its monthly throughput is 200,000 cubic yards. The company's larger dredge, the No. 1, operates at Puchong, Selangor, near Kuala Lumpur. Its maximum digging depth is 106 feet and it has a monthly throughput of 380,000 cubic yards.



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attend an atomic school for training in use of the atom for peaceful purposes. The course is intended to give technical assistance to foreign countries in the operation of atomic furnaces. A list of 16 candidates has been submitted by the Korean Ministry of Education, from which 12 will be selected by the school.

IRAQ—A British iron and steel expert has been in Iraq touring the northern part of the country to obtain soil samples. These are to be analyzed for their iron content. He left two assistants who are undertaking the same work in the southern part of the country. This expert came in response to inquiries made by the government regarding the possibility of promoting an iron and steel industry in Iraq.

INDIA—It is reported that four different parties have so far applied for the reward of 10,000 rupees for discovery of uranium ore deposits. Two of the claims were rejected as not fulfilling the conditions laid down. The other two claims are under investigation. Instructions have been issued to all field geologists of the Raw Materials Division of the Department of Atomic Energy to the Department of Atomic Energy to the India the help of villagers in the search. Talks in local communities will emphasize what the mineral is, its value, and importance to the country.



HORTH AMERICA

NEW BRUNSWICK—Brunswick Mining and Smelting Company has completed its new 150-ton pilot mill at the company's Brunswick mine 20 miles south of Bathurst. A 4,000-ton concentrator is planned, and until its completion concentrate from the pilot mill will be stockpiled in five storage pits or shipped to a smelter for refining. Current plans for the Brunswick mine, where 23,000,000 tons of ore have been proved, call for stripping and open pitting to a depth of 250 feet on a 1,700-foot by 300-foot section before sinking a shaft. At the Anacon mine where 25,000,000 tons of ore have been outlined, the No. 1 shaft is down to the 412-foot level. Current plans call for sinking a second shaft to a possible depth of 4,200 feet with a planned first depth of 1,830 feet. The project is an amalgamation of properties held by Brunswick Mining and Smelting Corporation, Anacon Lead Mines Ltd., and Leadridge Mining Company, a subsidiary of St. Joseph Lead

QUEBEC—The Iron Ore Company of Canada is opening a third pit for production near its two other properties at Schefferville (formerly Knob Lake) on the Quebec-Labrador border. Stripping is already under way, along with building of access roads and construction of screening and crushing plants. The deposit, to be named for the late Charles D. French, former mines minister of Quebec, is about 2,500 feet long by 1,400 feet wide. Last year, the Iron Ore Company of Canada shipped 1,781,453 tons of iron ore from its new port at Seven Islands; pit production was about 2,800,000 tons. This year's objective is about 6,000,000 tons.

ONTARIO—Exploration for uranium in the Blind River area of Ontario is being undertaken by The New Jersey Zinc Exploration Company (Canada) Ltd., a subsidiary of the New Jersey Zinc Company. Also associated in the work is the Nueva Exploration Company of New York, a new corporation affiliated with The Texas Company. Some major uranium deposits already have been located in this area.

ALASKA—The United States Smelting Refining and Mining Company has moved its No. 5 dredge from Eldorado Creek to Dome Creek, 9% miles away, where it will operate in the coming season. This is the third dredge to be moved by the company, and the fourth move the company has made in recent years. The dredge is cut into four sections for the move and mounted on a specially built bobsled that has runners heated by propane gas at the start of any trip. Four D-8 Caterpillars pull the sled.

QUEBEC—Another new asbestos mill is planned for the Eastern Townships of Ouebec. Preparation of a site has started and construction will be started this summer. Ore for the mill will come from the large asbestos deposits located by Quebec Asbestos Corporation last fall. The mine will be operated by Carey Canadian Mines, Ltd. and will probably not get under way until late in 1956. Both firms are subsidiaries of Philip Carey Manufacturing Company of Cincinnati, Ohio, Quebec Asbestos, which discovered this latest ore body, will continue production at its original property at East Broughton, which is about four miles from the new property. The new project is expected to cost about \$8,000,000 to bring into production.

ONTARIO—Jonsmith Mines Ltd. reports encouraging results from its diamond drilling program on the optioned property adjoining the Whistle mine of International Nickel Company of Canada



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ENGINEERS SYNDICATE, LTD. 8011 Hollywood Borlovard Hollywood 27, California Otympio 2167 \$39.75 (battery 90¢). A.C. units \$12.50 up in the Sudbury district. Two of the several anomalies outlined by an earlier geophysical survey have now been drilled and have shown values in nickel and copper. These zones will be tested at greater depth.

NOVA SCOTIA—Mineral Exploration Corporation, Ltd. (MINEX) has started underground exploration of its property near Ment Cove, Cape Breton Island. A 900-foot adit is being driven to reach the mineralized zone and to make possible thorough sampling of the ore. It will also serve as a diamond drill base. The adit is expected to reach the zone already examined on the surface. The exploration work to date indicates large tonnages of zinc, with germanium oxide, and cadmium values.

BRITISH COLUMBIA—Sheep Creek Gold Mines, Ltd. is stepping up production of zinc-lead ore from 400 tons a day to 500 tons at its Mineral King mine in the Invermere district. Millheads have been averaging about 6% percent combined metal. Costs, including mining, milling, and overhead, have been running under \$5 a ton. Three replacement type ore bodies have been opened by underground work so far. Diamond drilling has indicated ore reserves of approximately 400,000 tons. At the Ainsworth district property of Western Mines, Ltd., diamond drilling is scheduled this spring. Geological and geophysical work carried out by Consolidated Mining and Smelting Company of Canada, Ltd. has indicated structures which may have controlled formation of lead-zinc replacement deposits in limestone beds.

ALASKA-Alaska Copper Mines, Inc. intends to complete its DMEA exploration work in the spring. Exploration undertaken last summer revealed no large-scale copper deposits. The company's

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property is on the south slope of the Alaska Range near Tangle Lakes.

Alaska Range near Tangle Lakes.

SASKATCHEWAN — Goldfields Uranium Mines Ltd. has opened its 1955 season with start of underground development work on its "62" ore zone adjoining the Rix, and a program of diamond drilling in the Medusa Lake section of the camp. The initial program on the "62" ore zone will involve shaft sinking and lateral development work on one level.

BRITISH COLUMBIA—The Noordow

BRITISH COLUMBIA—The Noonday group of eight silver-lead claims near Sandon has been leased to Pat McCrory and associates by Alpine Mining Company. The lessees hope to start smelter shipments in the spring.

NEW BRUNSWICK—Loch Alva Mines Ltd. has been formed by a group of businessmen who recently located a promising copper discovery in the Musquash area south of St. John. The new firm holds 5,460 acres in the area, which are now being explored. Some lead, gold, and silver were also found in random samples taken from preliminary surface stripping and blasting.

BRITISH COLUMBIA—Deer Horn Mines, Ltd. operating in the Tweedsmuir Park area, has intersected ore 171 feet from the portal of its adit, and at last report was continuing ahead to the anticipated junction of two vein systems. L. F. Labow is manager.





REPRESENTATIVES: Western Machinery Co., Denver and Grand Juntition, Colo.; Holson Equipment Co., Portland, Orc.; Tetem Equipment Co., Seattle, Wash.; Recky Meuntain Equipment Co., Seattle, Wash.; Recky Meuntain Equipment Co., Seat Lake City, Utah; D. W. Jaguerys & Co., Phenelix, Arizona; C. H. Bull Co., Sea Francisce, California and Rone, Neveder; J. S. Morton Equipment Co., Abliene, Toxas; Gabring Equipment Co., Cosper, Wyoming; Inland Supply Co., Les Vogus, Nov.; Mine & Mill Machinery Co., and Smerick Engineering Co., Les Angeles, oilf.; Alliad Equipment Co., Medb, Utah Bit & Steel, Midvate, Utah.

NEW **VULCAN-DENVER** EXTRA HEAVY DUTY 50h.p. SLUSHER HOIST



New Vulcan-Denver double drum single shaft 50 h.p. slusher hoist... 1 of 13 operating in this western mine. Selection of Vulcan hoists was based on this company's successful experience with Vulcan's 150 h.p. slushers during the past 20 years.

The rugged design of these units features extra heavy gears, shafts, bearings and a special all-steel highrated motor...to assure dependable operation.

HOISTS: 10 TO 1,500 H.P. SLUSHER HOISTS: 15 TO 150 H.P. ALUMINUM CAGES & SKIPS



VULCAN IRON WORKS COMPANY

1423 STOUT, DENVER, COLORADO

Angola Diamonds

(Continued from page 46)

per hour. Mill discharge is returned several times for re-grinding. When the quantity of the concentrate has been reduced sufficiently in this manner, the small amount that remains is fed to a miniature, side-shaking grease table. This table is 4 feet long and has six decks. Each deck is about 10 inches wide by 8 inches long, and is easily removable for cleaning and re-greasing. The table tailing is again hand-sorted and finally discarded.

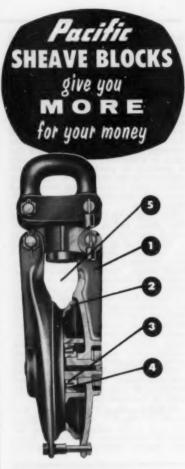
The 6.0-to-25 millimeter, handsorted tailing is not fed to the small ball mill. Instead, it is ground in a similar type mill 10 feet long by 3 feet in diameter until fine enough to pass through a 1.09-millimeter screen. All tailings from the recovery processes in the sorting station are finally ground in this mill. This is done not only to recover any diamonds not retrieved previously by these methods, but also, and mainly, to ensure that no diamonds may later be stolen from the tailing dumps.

Concentrating Fines

The plus-1.09, minus-3-millimeter concentrate is first dried in a steamheated cabinet, and then fed to an electromagnetic Exolon separator. The magnetic portion of the fine low-grade concentrate is then ground in the 10by 3-foot ball mill already described. The non-magnetic portion, which contains the diamonds, is fed to a fullsized, side-shaking grease table. Table tailing is collected and ground in the 18- by 18-inch ball mill. After grinding, the remaining portion of the concentrate is fed to the miniature grease

Magnetic Minerals

There is one deposit from which the concentrate is treated differently than has been described. This concentrate contains a very large percentage of magnetic minerals. The incoming concentrate is first partially sized with the trommel screens, and the resulting 6- to 25-millimeter portion fed directly to the grease table in the normal way. The remaining concentrate is dried and magnetically separated in a machine of the Krupp type. The bulk of the gravel is removed from the concentrate as a magnetic concentrate. The remainder which contains the diamonds is sized into two fractions. plus-1.09, minus-3-millimeter, and plus 3, minus 6-millimeter. After sizeing, this is fed to the grease tables as in the usual method.



OUTSTANDING FEATURES:

1. The only Sheave Blocks with manganese steel sheaves and side frames for toughness, shock resistance and long life.

2. Sheave rims are recessed into side

frames to prevent rope fouling.

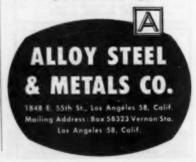
3. Efficient grease seals retain lubricant and exclude foreign material.

4. Tapered roller bearings are load-rated

with extra-high safety factor.

5. Wide throat passes square knots. Available in Half Side Plate and Full Side Plate Models in 8", 10" and 12" sizes with hook, shackle or safety swivel shackle. Send for name of nearest representative and for Bulletin No. 238 covering complete line.

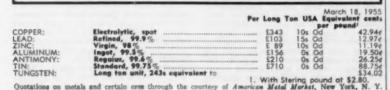
OTHER PACIFIC PRODUCTS: Jaw Crushers, "Slushmaster" Scrapers, "Round-The-Cor-ner" Sheave Blocks, Bit Knockers and a wide variety of Pacific Wearing Parts.



U.S.A. Metal & Mineral Prices

	METALS
COPPER:	Electrolytic. Delivered F.o.b. cars, Valley basis
	Lake. Delivered, destinations, U.S.A
LEAD:	Common Grade. New York
ZINC:	HETALS Electrolytic. Delivered F.o.b. cars, Valley basis 33.00e Lake. Delivered, destrinations, U.S.A 33.00e Foreign Copper. Volley basis 33.00e Common Grade. New York 15.00e Tri-State Concentrates, jig, flotation 80% lead, per ton \$187.50 Prime Western; F.o.b. E. St. Louis 11.50e Prime Western; Delivered, New York 12.00e Tri-State Concentrate, 60 % zinc, per ton 568.00 Primery 30 Pound linguist (99% plus), F.o.b. shipping points 23.20e Lone Ster Brand, F.o.b. Laredo, in bulk 29.00e (In ton lots) price per pound \$2.25 Sticks end bars. 1 to 5 ton lots (Price per pound) \$1.70 97.99%, keg of 550 pounds (Price per pound) \$2.60 Pewder Norm, per pound \$75.00 Pewder Norm, per pound \$75.00 Pewder Norm, per pound \$75.00 Pewder \$32.00 - \$324.00 Pewder \$320.00 - \$324.00 Pewder \$320
A111441511144-	Tri-State Concentrate, 60% zinc, per ton
ALUMINUM: ANTIMONY:	Lone Star Brand, F.o.b. Loredo, in bulk 29.00e
BISMUTH:	(In ton lots) price per pound\$2.25
CADMIUM: COBALT:	97-99%, keg of 550 pounds (Price per pound)
COLUMBIUM:	Powder
LITHIUM: MAGNESIUM:	78% (per pound)
MAGNESIUM: MERCURY:	Flasks. Small lots, New York
NICKEL:	Grade A. Brands, New York (Price per pound) Prompt delivery 94.30¢
TITANIUM: GOLD:	99.3% + Grade "A" (Price per pound)
SILVER:	Newly mined domestic. United States Treasury price
PLATINUM:	Foreign Handy & Harmon
ZIRCONIUM:	Sponge, Per Pound \$10.00
	ORES AND CONCENTRATES
BERYLLIUM ORE:	10 to 12% BeO. Fold mine Colorado S47.00 per unit
DENTILION ONE.	ORES AND CONCENTRATES 10 to 12% BeO. F.o.b. mine, Colorado Sanol lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at \$400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, \$40 per unit; 9.0 to 9.9%, \$45; over 10.0%, \$50. F.o.b. railroad cars eastern seaports. Long tons dry weight. African (Rhodesien). 48% Cr.03. Ne Retio Turkish. 48% Cr.03. to 1 chrome-iron ratio S44.00-\$45.00 African (Transveal). 48% Cr.03. Ne Retio Turkish. 48% Cr.03. to 1 chrome-iron ratio S46.00 U. S. Government are purchase depot Grants Pass, Oregon, Base price, jumpy ore, \$115.00; fines and concentrates \$110.00 for 48% Cr.33 and a 3 to 1 chromium-iron ratio. Premiums for higher grade are and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr.03. At United States small lot beryl purchase depots. \$3.40 per pound contained combined pentoxides in 50% ore. Includes 100% bonus. Lake Superior. Per gross ton Lower Lake Ports Mesabi, Non Bessemer, \$1.5% Fe. Second quarter Mesabi, Non Bessemer, \$1.5% Fe. Second quarter Mesabi, Non Bessemer, \$1.5% Fe. Second quarter Mesabi, Atlantic Ports, 60 to 68% Fe. Contracts, Per Unit \$0.90-\$0.95 Old Range Bessemer. Second quarter Mesabi, Atlantic Ports, 60 to 68% Fe. Contracts, Per Unit \$0.85-\$0.95 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.90-\$0.95 Metallurgical grade. 46 to 48% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 46 to 48% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 47 to 48% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 48 to 40% Mn. Long ton unit \$0.85-\$0.95 Metallurgical grade. 49 to 40% Mn. Mn. Base price of \$6.48 per long dry ton of 18% manganese ore.
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.
	African (Rhodesian). 48% Cr ₂ O ₃ . 3 to 1 Ratio
	Turkish. 48% Cr2Os. 3 to 1 chrome-iron ratio
	U. S. Government are purchase depot Grants Pass, Oregon, Base price, jumpy ore, \$115.00; fines and concentrates \$110.00 for 48% Cro3, and a 3 to 1
	chromium-iron ratio. Premiums for higher grade are and for a ratio up to
COLUMBIUM-	3.5 to 1, Penalties for grades down to 42% Cr ₂ O ₂ . At United States small lot heryl purchase depats, \$3.40 per pound contained
TANTALUM ORE:	combined pentoxides in 50% ore. Includes 100% bonus.
IRON ORE:	Lake Superior, Per gross fon Lower Lake Ports Mesahi, Non Bessemer, \$1.5% Fe. Second quarter \$10.10
	Mesabi, Bessemer, 51.5% Fe. Second quarter
	Old Range Bessemer, Second quarter \$10.25
MANICANIECE COE	Swedish, Atlantic Ports, 60 to 68% Fe. Contracts, Per Unit
MANGANESE ORE:	Metallurgical grade, 48 to 50 % Mn. Long ton unit
	Metallurgical grade. 45 to 46% Mn. Long ton unit \$0.75-\$0.80
	Domestic U. S. Government are purchasing depots: Deming, New Mexico;
	base price \$2.30 per long dry ton unit of recoverable manganese less
	dry ton of 15% manganese ore, Butte, Montana; (black and pink ores,
	base price of \$4.87 per long dry ton of 18% manganese are. Phillipsburg
	Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%)
MOLYBDENUM	\$2.30 per unit with premiums and penalties.
CONCENTRATE: TUNGSTEN	molybdenum, plus cost of containers
TUNGSTEN CONCENTRATE:	Domestic. 60% WOs Per short ton unit
	Foreign. South American, Spanish, Portuguese
URANIUM ORE:	Carnetite-Rescoelite. F.o.b. purchase depot plus \$0.06 per ton mile (\$6.00
	Salt Lake City, Marysvale, Thompsons, Moab, White Canyon, Green River
	and Monticello, Utah. Shiprock, and Bluewater, New Mexico, Edgemont, S
	is \$1.50 per pound and up to \$3.50 per pound of contained U ₁ O ₆ plus \$0.7
	per pound for each pound in excess of 4 pounds per short dry ton and a
	\$0.50 per pound development allowance paid on all ore purchases. At Ship
VANADIUM ORE:	rock all ores with more than 6% lime are penalized for excess lime.
VARADIOM ORE:	are generally acceptable at all AEC depots, but excess not paid for at Marys
	vale, Monticello, Shiprock, and Bluewater Per Pound V ₂ O ₅ \$0.3
	NON-METALLIC MINERALS
BENTONITE:	Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots \$12.5
FLUORSPAR:	NON-METALLIC MINERALS Minss-200-messh. F.o.b. Wyoming points. Per ton in carload lats \$12.50 Oil Well grede. Packed in 100 pound paper bags \$14.00 Metallurgical grede. 70% effective CaF; content per short ton F.o.b. Illinois-Kentucky mines \$32.00 Mexicen. 70% f.o.b. border \$22.00 European, Atlantic Ports, 70% \$30.00 Acid Grede. 97% CaFs F.o.b. Kentucky, Illinois, Colorado \$50.00 Crude: F.o.b. mine per short ton \$3.00 to \$50.00 Plaster gredes. Crushed and sized. F.o.b. plants \$7.00 to \$9.00 Long fon, F.o.b. Hoskins Mound, Texas \$30.50 Export \$30.50
	Illinois-Kentucky mines\$32.0
	European, Atlantic Ports, 70% \$30.0
PERLITE:	Acid Grade, 97% CaF ₃ F.o.b. Kentucky, Illinois, Colorado
PERLITE:	Plaster grades, Crushed and sized, F.o.b. plants \$3.00 to \$5.0
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas
	\$30.5







GREATER FOOTAGE at LOWER COST with Sprague & Henwood's "ORIENTED" Digmond Bits

That's our story in a nut shell and we're proving it every day—not only in our own world-wide contract core drilling operations, but also through the money-saving results being achieved by hundreds of other satisfied users.

After extensive comparative tests had demonstrated to our satisfaction that drill diamonds cut much faster and last much longer when "oriented" in the matrix with their hardest edge or "vector" toward the work, we decided that random setting was both inefficient and wasteful. Since then we have standardized on oriented diamond bits and have produced THOUSANDS — in a wide variety of types and sizes; with both cast—and powdered-metal matrices.

Only selected diamonds of suitable crystaline structure can be used and only specially trained and equipped setters of more than usual aptitude can be relied upon to orient diamonds correctly in the mold, but we are now fully organized for efficient production of ORIENTED DIAMOND BITS, at no additional cost to purchasers.

In terms of footage cost, these are the most economical diamond bits ever produced and we invite inquiries on that basis.

Bulletin 320 illustrates and describes all types and gives complete working data. Write for a free copy and sell us about your diamond drilling requirements. Our experienced executives welcome opportunities to make money-aaving suggestions without charge or obligation.

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PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.



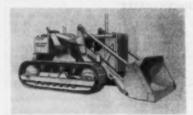
Low Head Gismo and New Cars Speed Drifting Cycle

A new type of low-head Gismo hard rock, self-loading ore transport, together with drilling jumbo, has been developed to operate in a development heading. The new unit has been designed to operate in an 11-by 11-foot tracked heading, along with specially designed 3 compartment bottom dump cars. For loading, the Gismo scoops broken rock at the face, then backs up an inclined ramp, and travels over the string of low-head cars dumping its load in the car furthest from the face. It then returns to the face for another load. It is reported that the Gismo can muck out an 11-by 11-foot drift, in which a 10-foot round has been broken, in 45-minutes. When the face is cleaned up, the Gismo is fitted with booms and drills. Sanford-Day Iron Works will manufacture the unit. For more information circle No. 62.



B-E Announces New 40-R Rotary Blast Hole Drill

A rotary blast hole drill for putting down medium-diameter holes is now offered by Bucyrus-Erie Co., South Milwaukee, Wis. The new Model 40-R is designed along the same lines as the larger 50-R, the first machine capable of drilling 124-inch holes. The new unit is available with electric or dieselelectric power and is equipped to drill 6% to 9-inch holes. The crawler mounted drill features hydraulically powered down pressure on the bit for maximum controlled penetration; Ward Leonard electric control for rotation of drill pipe, for propelling and hoisting; continuous drilling for 27%-feet before an additional drill pipe must be added. For additional data circle No. 63,



New, More Powerful 2 Yd. Allis-Chalmers Tractor

A new more powerful 2-yard model HD-9G tractor shovel has been introduced by the Allis-Chalmers Manufacturing Company. The new tractor shovel has design modifications and construction improvements which are said to offer greater productivity, longer life, maintenance simplicity, ease of operation and maximum visibility. Also, a completely new bucket has been designed for the HD-9G to make digging, loading, and dumping easier, faster and with less spillage. For full data circle No. 68.

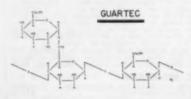
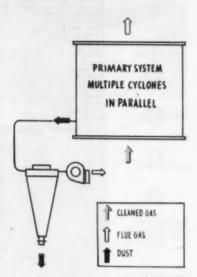


FIGURE 1

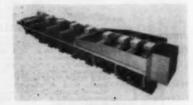
A New Chemical for Ore Dressing . . . Guartec

Guartec, a product obtained from guarbeans, is now offered to the mining industry by General Mills, Inc., Minneapolis, Minn. It promises to be of help to metallurgists with knotty ore dressing problems. Test work has indicated that Guartec acts as an efficient flocculant and as a depressant for certain gangue minerals. It is said that it increases the settling rates of mineral suspensions. As a depressant, Guartec is said to be particularly effective in depressing clays. For full details on this new reagent circle No. 61.



New Multi-Cyclone System Steps Up Dust Collection

A new type of mechanical dust collector, called the Paraclone, has been designed by the Aerodyne Development Corp. The new unit, which is claimed to be a more efficient type, differs from conventional systems embodying a large number of small cyclones in parallel by having a secondary circuit which keeps the discharge from the small cyclones under a constant negative pressure. This prevents recycling of dust in the primary system, a disadvantage inherent in large installations of this type lacking the secondary circuit. Circle No. 69.



Power-Operating Valve For Eagle Thickening Tanks

The Eagle Iron Works has developed a positive acting electric-hydraulic power-operated bleeder valve to control proper depth of settled material in Eagle thickening tanks. Eagle thickeners equipped with the new valves not only provide a better thickening action, but assure greatly improved classification. When using the new valve there is no possibility of build-up of material. Circle No. 76.

AUTOMATIC COUPLER for asrrow gauge mine cars developed by Mayo Tunnel and Mine Equipment of Lancaster, Pa., is asie and quick acting. Entirely automatic, the Mayo coupler hooks on in seconds to completely eliminate the harards of hand coupling. For literature circle No. 1.

POWER STEERING BOOSTER of new, compact design has been announced by Vickers Inc. for mobile machinery. The steering booster transmits all road shock to the chassis, so that the steering wheel can't be jerked out of the driver's control when ruts or obstructions are encountered. The unit can be either factory installed or mounted on vehicles in service. For details circle No. 2.

ENGINEERED VIBRATING SCREENS to meet individual needs in the process industries are available from Productive Equipment Corp., Chicago, Ill. They feature controlled eccentric action, and accurate stroke adjustment. For latest literature circle No. 3.

ature circle No. 3.

REMOTE CONTROLLED FEED proportioning system is described in a 28-page bulletin offered by Richardson Scale Co., Clifton, N. J. Besides describing how Richardson's Select-O-Weigh system works, the bulletin details eleven installations now in use. The proportioning system permits remote dialing of individual ingredient weights for controlled feeding. For copies of bulletin 0351 circle No. 4. NEW ENGINE CATALOG describes and illustrates the 115 to 410 horsepower engines made by Le Roi Division of Westinghouse Air Brake Company, Cutaway views and photographs show advanced features such as modern valve-in-head design. Copies of catalog E-9 can be obtained by circling No. 5.

PUBLIC LAND MAP: A Richmond, California firm made claim for the first map of public lands in the history of California. The maps show what lands are open for uranium claim staking. For further information write the Hunt Agency, 12416 San Pablo Avenue, Richmond, California, or circle No. 6.

TRIPLE DUTY FEEDER: The Schaffer Poidometer feeds, weighs and conveys granular or crushed materials for process industries. The unit is self contained equipped with a recording device, and furnished with an automatic control gate which stops the Poidmeter when supply

bins become too low. Additional information can be obtained by circling No. 7.

ENGINE WEAR METER: The Gerin Corporation of Avon, N. J., has designed a guage which can be permanently attached to any engine, and claims to warn the operator when there is fuel dilution, water or antifreeze leakage, or wrong grade make-up oil. The maker states that the meter incorporates a revolutionary principle that selectively responds only to viscosity changes caused by change in composition of the lube oil, and ignores the normal rise and fall of viscosity due to temperature. Circle No. 8 for details.

TORQUE FLOW PUMP: A new principle of dynamic solids pumping is utilized in Western Machinery Company's new sand pump. The difference is the recessed impeller which eliminates clogging and establishes a new low for wear on pump parts. For complete details on this new pump circle No. 9:

STRONG SHUTTLE CAR CABLE: A new shuttle car cable made by Anaconda Wire & Cable Company is constructed to balance jacket strength with increased internal strength. A neoprene insulating compound has replaced conventional rubber insulation. The development is said to overcome a common cause of failure in shuttle car cable—concealed insulation breaks, hidden by the jacket. For additional information circle No. 10.

HYDRAULIC JIM CROW: An efficient and easy-to-operate hydraulic rail bender is now available from The Aldon Company of Chicago, III. It is made in 3 sizes for rail of 20 to 80 pound sections. The tool is easily portable and takes much of the time and effort out of track maintenance. Circle No. 11.

RADIOMETRIC SURVEYING: A team of specialists furnished by Nuclear-Chicago is ready to take over your exploration problems. They have developed an improved system of aerial prospecting and tracking down radioactive anamolies. In addition they offer a geiger counter, packed with 10 geiger-muller tubes, priced at \$325. Circle No. 12 for information.

ELECTRONIC SHOVEL CONTROL: Now standard equipment on all P & H electric shovels, the electronic control, obtained through thyratron tubes, is applied to all operating motions. The smooth performance which follows is said to result in a 5 to 10 percent faster cycle. For complete information on Harnischfeger Corporation's latest development circle No. 13.

JAW CRUSHER BULLETIN: Traylor HB jaw crushers are featured in bulletin 5105. The bulletin points out that the curved jaw plates apply power as a direct crushing force which has resulted in reduced maintenance costs and power requirements. Circle No. 15 for your copy. URANIUM DETECTOR: A brand new, low cost, optical radioactivity detector for prospectors, engineers and hobbyists is now available from Ken Research of Hackensack, New Jersey. The instrument needs no power source, and can be furnished with a weatherproof holster. Price for the Professional Model is \$5.00. Circle No. 16 for information.

CONVEYOR GUIDEBOOK: A 340-page guide to a complete standard line of power transmission and conveying equipment is now available from Link-Belt Company. The indexed book contains valuable information for the engineer or layout man in selecting standard products for new installations or for replacements. If you are interested in receiving this catalog circle No. 17.

INCREASED DRILLING TIME is just one of the many advantages offered by the Longyear wire line core barrel. This recent development of the E. J. Longyear Company of Minneapolis, Minn., permits hoisting of the core barrel without removing the string of rods from the hole. Bulletin 201 gives complete details. Circle No. 18.

BORE HOLE GEIGER COUNTER: A new lightweight, compact instrument that makes possible the radio-metric logging of bore holes without expensive core drilling has been announced by Jeb Instruments. Called the DEPTHMASTER, the new instrument is completely self-contained and is easily handled by one man. For full information just circle No. 21.

A LONG LONG PULL: Bethlehem wire rope, manufactured by the Bethlehem Steel Company, has set a record at an Alabama mine by hauling more than 1,000,000 tons of material. The 10,000-foot rope has been in service for more than three years. For free information on long-life Bethlehem wire rope circle No. 22.

Circle numbers and mail this card for free product literature

to get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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HEAVY-DUTY ENGINES: Righteen heavy-duty power units, the biggest selection in the industry, are described in a new catalog just published by the International Harvester Company. The 18 heavy-duty engines have a range of from 16.5 to 200 net horsepower, which means that there is an engine just right for virtually any specific power need. Circle No. 27.

CAMERA LUCIKON manufactured by the M. P. Goodkin Company enlarges or reduces blue prints and drawings to the desired size for study, making corrections, etc. The Camera Lucikon will take any-thing opaque, transparent or three di-mensional which can be placed on the copyboard, and enlarge or reduce the sub-ject matter 400 percent in true color. Circle No. 24.

Circle No. 24.

DUCON BIN VENT FILTER: A new bulletin describing the type UFV bin vent filter is announced by The Ducon Company. The Ducon bin vent filter provides a standard, adaptable unit for applications where a hopper, bin or other enclosure should be maintained under a slight vacuum to prevent the escape of product or dust to surrounding atmosphere. Circle No. 24 No. 25.

POWER FOR PROGRESS is the title of a brochure published by the Detroit Diesel Engine Division of the General Motors Corporation. The brochure gives operating characteristics and specifications of the many General Motor Diesel en-gines. For your copy circle No. 28.

gines. For your copy circle No. 28.

RUBBER HOSE CHECK LIST, ideal for company bulletin boards, is offered by Thermoid Company, Trenton, New Jersey, Plant maintenance engineers will be interested in the check list to obtain longer bose life and better performance. The chart is 8½ by 11-inches, and highlights 4 common abuses of hose with drawings. For a copy circle No. 26.

crawings. For a copy circle No. 26.

LOW SPEED TACHOMETER: A new low speed model has been added to the line of tachometers and vibration indicators made by Martin Engineering Company of Neponset, Illinois, It has a range from 200 to 2,000 cycles per minute, making it useful for finding speed of wibrating equipment such as acreens or crushers. Cost of the pocket size unit is \$10.00. Circle No. 29.

PERMANENT MAGNETIC PULLEY applications and features are described in a new illustrated eight page bulletin PY-

260 by Homer Manufacturing Company, Lima, Ohio. Also included are diagrams, performance data, specifications and a guide for selecting proper sizes. Copies are available from Homer Manufacturing Company, Dept. 172, or by circling No.

NEW PENNSYLVANIA BULLETIN: A catalog published by the Pennsylvania Pump and Compressor Company describes and illustrates their line of single-stage, straight-line, heavy-duty, water-cooled air and gas compressors. For your copy circle No. 31.

cle No. 31.

SEISMIC EXPLORATION has been limited in the past by the inability of instruments to record low frequency energy. With a very low frequency system developed by Houston Technical Laboratories low frequencies are easily recorded, resulting in wider and deeper probing of subsurface conditions. For complete information on this new development circle No. 19. de No. 19.

cle No. 19.

SMALLER AIR STARTING MOTOR is announced by Ingersoll-Rand, the originator of air starting motors for diesel and large gasoline engines. This new starting motor is known as the size 5BM and is designed for starting service on gasoline engines with from 750- to 1,750-cubic-inch displacement and for Diesel engines with from 300- to 700-cubic-inch displacement. Circle No. 20.

ment. Circle No. 20.

FOR BETTER AIR POWER, a new engineering service bulletin, "A Better Air Power System" has been published by Ingersoll-Rand Company. The bulletin points out that power losses in compressed air lines are frequently as much as 30 to 50 percent, and describes how to go about analyzing your own distribution system. Circle No. 39 for your copy. tion system. Circle No. 39 for your copy.

ALL PURPOSE ATTACHMENT: The
versatile, new International Drott 4-in-1
skid shovel is described in a catalog published by Drott Manufacturing Company,
Milwaukee, Wis. The tractor operator by
placing the "shovel selector" in the desired poeition, can convert the unit into
a bull clam shovel, a skid-shovel, a bulldozer or a clamshell. Circle No. 40.

NEW VENTILATING TUBING intro-duced by American Brattice Cloth Cor-poration, Warsaw, Indiana, is made from special neoprene coated nylon fabric. Ad-vantages claimed for the tubing known as Neolon, are its resistance to tearing or punctures, resistance to oils and acids and

its comparative light weight. For more information circle No. 33.

MODERN MINING METHODS is the name of a booklet published by the Allis-Chalmers Manufacturing Company. The booklet illustrates the important role that A-C equipment plays in all phases of mining. To get your copy circle No. 46. mining. To get your copy circle No. 46. KING SIZE DYNAMITE cartridges are now commercially available in four lengths, and small diameters, according to an announcement by the Explosives Department of Hercules Powder Company. All Hercules cartridges are now available in these lengths: 24, 20, 16, and 12-inches. The diameters are: 1½, 1½ and 2-inches. Circle No. 48 for full information.

DRY FLUID DRIVE: Flexidyne, a dry fluid drive developed by Dodge Manufacturing Corporation, handles difficult starting and reversing problems, and reportedly gives a new kind of protection against shock and overloads. It has wide applications for industrial drives involving heavy inertia and shock loads. Circle No. 43 for additional information.

BIT GRINDERS: Bitco, Inc. of Walls BIT GMINDERS: Bitco, Inc. of Wallace, Idaho has published a 4-page folder, punched to fit the engineering notebook. It gives instructions, parts lists, and general information on their grinder for detachable carbide bits. The unit is mounted on a high speed 1/4 hp. bench grinder. Circle No. 41 for your copy of the folder. MINIATURE CORE DRILL: The bigg MINIATURE CORE DRILL: The biggest little core drill in the world is how Du-Jac Manufacturing Corporation of Houston, Texas describe their hand portable rig. Total weight including 20 lengths of drill rod is 296 pounds, and the unit can be assembled in 10 minutes. Rated depth is 300 feet. A 3.6 hp. gasoline engine is used to drive the unit. For complete destile risely No. 48. plete details circle No. 45.

FLUOSOLIDS BULLETIN: Dorr-Oliver PLUCSOLIDS BULLETIN: Dorr-Oliver Incorporated announces the availability of a new, 4-page, two-color bulletin, "Fluo-Solids Systems for Drying, Sixing, or Heat Treatment." It describes the operation, advantages, theory and background as well as typical installations of Fluo-solids systems. Circle No. 47.

CONVEYOR SELECTION: Pioneer Engineering Works Inc., Minnespolis, Minn., has published a 52 page book telling how to select the right conveyor for your job. For copies circle No. 14.





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New Portable Core Drilling Machine for Prospecting

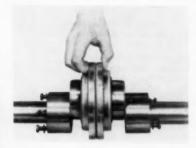
A new lightweight, portable core-drill-ing machine with detachable bits for use by miners and prospectors has been developed by Demo Tool Corp., Los Angeles. The machine is said to be the only one of its type capable of being transported with ease even into remote

transported with ease even into remote areas of difficult access.
Weighing only 50 pounds, the Demo DL 875S drills fast, self cleaning holes from ½ to 6-inches in diameter. It utilizes a unique rotary cutting action, and the carbide tipped shatterproof bit strikes 8400 blows per minute while rotating at 350 rpm. It operates on 110 volt AC-DC current, and is powered by a lightweight portable generator. For complete details circle No. 60.



4-Ton Capacity Increase For Model C Tournapull

LeTourneau-Westinghouse reports that the capacity of its model (Tournapull has been increased from 18 to 22 tons. Struck capacity of the new unit is now rated at 14.7 yards—heaped its 17 yards. To provide for this greater load-carrying capacity the inside width of the rear dump has been increased 10 inches at the top and its top length has been increased 2 inches. Changes have also been made in reinforcements to achieve greater ruggedness for the new model C. Other components which have long characterized this unit remain the same. For complete data on the model C Tournapull circle No. 73.



Spacer Type Coupling Simplifies Maintenance

Operating and maintenance engineers will appreciate the new type F Steelflex spacer coupling manufactured by The Falk Corporation. This coupling is ideal for use between for use between motors and pumps, where a gap between shafts must be provided to permit removal of pump impeller shaft assemblies, or on any application where a large gap (up to 12 inches) cannot be avoided. Over and above the protection which the Steelflex design offers against damage from impact loads and shaft misalignment, the spacer coupling affords easy connection and disconnection of shafts without disassembling the coupling. For further in-formation circle No. 70.



Link-Belt 3/4-Yard Shovel-Crane Has Speed-O-Matic

Modern Speed-o-Matic controls are available for the first time on Heavy-duty, %-yard machines with the introduction of the LS-88 shovel-crane by the Link-Belt Speeder Corporation. According to Link-Belt machine movements are smoother, safer, faster and more precise when using Speed-o-Matic controls. The movement of short-throw levers meters pressure for full control of power for all machine functions, to assure extra speed and minimize end-of-shift operator letdown. Statistics are claimed to show that this can result in increasing production up to 25 percent or more. For more data circle No. 78.



New Super-Sensitive Uranium Detector

The Detectron Corporation has just announced a completely new Nucliometer known as the DR-299. It is used for the detection of deep deposits of uranium, for aerial survey work, and a detachable probe is provided so that it can also be used as a geiger counter to check spectomens. The DR-299 incorporates the new bismuth tubes as part of the detecting element. Complete information is available from Detectron Corporation, Vineland Avenue, Department HH, North Hollywood, California, or by circling

Notes From The Manufacturers

J. P. Jung has been named regional manager, Southeastern Region, by the Cummins Engine Company, Inc., Columbus, Indiana. Mr. Jung, who has been with Cummins since 1947, will establish headquarters in Atlanta, Georgia. He replaces R. P. Parshall, who has moved to Milwaukee, Wisconsin to take over the Cummins distributorship as president of Cummins Diesel of Wisconsin, Inc.

David F. Christnelly, Stearns Magnetic, Inc., was recently appointed Assistant Sales Manager for the Milwaukee, Wisconsin manufacturer of magnetic separation and transmission equipment. J. P. Jung has been named regional

separation and transmission equipment. He will be responsible for assisting in the selling of the firm's entire line of equipment and will act as liaison between the

company and its field representatives. John D. Russell, formerly manager of engineering, Joy Manufacturing Com-pany, has been appointed vice president

pany, has been appointed vice president in charge of engineering and will maintain headquarters at the firm's executive offices in Pittsburgh, Pennsylvania.

George R. Rabb, who has just completed two years of supervising the installation and operation of machinery at several lime and cement plants in Mexicolar the several lime and cement plants in Mexicolar the staff of Texas and the staff of Texas and the several lime and cement plants in Mexicolar the several lime and cement plants in Mexicolar the several lime and cement plants in Mexicolar the several lime and cement plants are several lime and cement plants in Mexicolar the several lime and cement plants are severali co, has been added to the staff of Tray-lor Engineering & Manufacturing Com-pany, Allentown, Pennsylvania. He has had 13 years experience in the mine equipment field and will serve as field and erecting engineer for Traylor.

Hundreds of Welders Step-Up Production with

TWO MANGA-TONE

using new, fast, easy techniques

Two-Tone welding is not difficult for any good welder of experience. He will be amazed at the ease of depositing enormous amounts of metal, by following certain little changes of technique.

In the same time it would take the average good welder to lay down about five pounds of coated or bare nickel-manganese electrodes of the conventional type, he can deposit at least 12 pounds of Two-Tone Manga-Tone. With practice he can increase this to 15 pounds on perfectly flat welding.

Nothing can be more tiring to the expert welder than to sit by the hour pouring on conventional type 1/4 inch electrodes and getting nowhere. Of course the job of rebuilding a manganese casting with an inch thickness of weld metal is not easy, but hundreds of welders now using the Two-Tone process will testify that it simplifies the job and speeds up production.

The photograph shows the correct position for the two rods. Call in our Field Man and let him show you the Two-Tone techniques that will save you hours of hard, hot work. There are a few different movements in the manipulation of the arc that can make a world of difference on heavy, hot welding jobs.



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Rare Metals Plans Idaho Mercury Operations

The El Paso Natural Gas Company is further diversifying its mining operations through its wholly owned subsidiary—Rare Metals Corporation of America, according to reports. In this instance, mercury is the metal sought. Previously the firm had centered its activity on uranium and recently purchased the Navajo Indian Reservation holdings of Arrowhead Uranium Company near Cameron, Arizona. (See MINING WORLD, March 1955, page 87.)

Rare Metals is planning to reopen the old Idaho Almaden Mines Corporation's Nutmeg cinnabar mines about 20 miles east of Weisser, Washington County, Idaho. A new 60-inch-diameter rotary kiln will reportedly be installed at the Nutmeg with first ore scheduled for furnacing in early summer. All mining is planned to be by open pitting with initial production scheduled between 150 and 175 tons per day. C. L. Perkins is general manager of the firm's mining operations with headquarters in Salt Lake City, Utah. M. H. Cline is assistant general manager.

The mine was discovered in 1936 by prospector and sheep man Harry Brown. The next year he staked 18 claims and called the mine the Osa Anna. In 1938 the mine was leased to L. K. Requa and associates who formed the Idaho Almaden company, developed an open-pit mine, installed a 50-ton-per-day Gould rotary kiln, and operated the mine until the low mercury price forced closing in late 1942.

Under Mr. Requa's direction, the mine became known as the Nutmeg, named for the sagebrush-covered hillside where the original ore had been discovered. Much of the ore furnaced by Idaho Almaden averaged 15 pounds mercury per ton. Cinnabar is the only ore mineral and is found in both the amorphous and crystalline form. It occurs in opalite, kaolin, sandstone, and quartz. Low-cost open pitting will permit Rare Metals to mine and furnace a much larger tomage of lower grade ore than was done by Idaho Almaden. The latter was forced to do more selective mining because of its small tonnage operation.

IPAHP

Sunset Mines, Inc. has stepped up development work at its Pine Creek district zinc-lead property, Shoshone County, Idaho in an effort to return the mine to profitable operation. A tunneling project for the adjoining Lookout Mining and Milling Company on the 1,200 level has been discontinued temporarily and crews put to work on Sunset's 800 and 1200 level. Diamond drilling also is under way. C. B. Merritt of Seattle is secretary.

A sand filling preparation plant is being completed at the Galena mine, west of Wallace, Idaho, by American Smelting and Refining Company. The plant will dewater mill tailings for use in filling mined stopes. Expansion of milling facilities to 350-ton daily capacity is virtually completed. About 130

men are employed at the property leased from Vulcan Silver-Lead Corporation, a subsidiary of Callahan Zinc-Lead Company. Day Mines, Inc. of Wallace has a one-fourth interest in the lease.

The Nevada-Stewart Mining Company property in the Coeur d'Alene mining region, Idaho, will be explored from the 2,300-foot level of the adjoining Sidney mine under an operating agreement with Sidney Mining Company. Sidney would bear all costs in return for 90 percent of returns until recovery of costs and 65 percent thereafter. Sidney expects to have its main shaft extended to the 2,300 level by late summer. Frank J. Luedke of Spokane is president of Nevada-Stewart. Malcolm C. Brown of Kellogg heads Sidney.

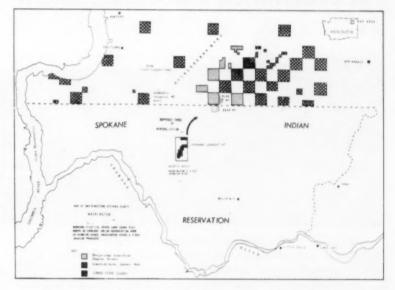
Birdye Mines, Inc., of Boise, Idaho, has been capitalized for \$300,000 by Emery W. and Lester G. Jacobson of Moran, Wyoming and Ardella Hall of Boise, to mine uranium and other minerals.

Golconda Lead Mines, Wallace, Idaho, has opened a moderate tonnage of medium-grade ore above the 1,600-foot level of its lead-zinc mine in the Coeur d'Alene mining region, Shoshone County, Idaho. Production is about 30 tons daily.

Block-leasers are removing ore remaining on the 1150 winze level. Several lowgrade zinc ore shoots have been opened on the 1800 level. A. H. Featherstone of Wallace is president.

Charles Plum of Leadore, Idaho and the Henderson brothers of Gilmore are readying their fourth carload of leadsilver ore from the United Idaho mine near Gilmore, Idaho where they are leasing. Two other sets of lessees are also at work on the property. Mike Barrett is working on the transportation tunnel level in the area of the United Idaho incline shaft, and Carlson & Hutchings have taken a lease in an area on the surface on the old original discovery area. All present production is going to the custom flotation mill of United States Smelting Refining and Mining Company at Midvale, Utah.

San Francisco Chemical Company, prime contractor for the Stauffer Chemical Company's Carthage project at North Lake in the Hot Springs Range, Idaho, reports that the cross cut has intersected the phosphate-bearing structure at a distance of 1,480 feet from the portal. The intersection point was almost exactly at the point projected at the time work started in July 1954. The



Rush for Uranium Claims Hits Washington!

The office of the Washington State Commissioner for Public Lands has been swamped by applications for prospecting leases on state lands for miles around the Midnite Mines' uranium discovery of John and James LeBret on the Spokane Indian Reservation in southwestern Stevens County. The state owns an unusually large amount of land immediately north of the reservation and virtually all of this has been taken up for 10 miles to the north as shown by various shaded areas on the accompanying map. Each large square is a 640-ac a section. First to apply for the state land were people associated with Phelps Dodge Corporation of Douglas, Arizona. They filed on about 2,700 acres shown on the map as dot filled areas. Grandview Mines was next with nearly 2,000 acres (indicated on the map by diagonals). More than 25,000 acres have now been filed on but no discoveries have yet been made on state land. Among recent filers are Albert L. Ray and associates who have been diamond drilling a nine-claim group; Viking Excavator Company of Spekane with 31 mining claim locations; Berne W. Mackett and Donald E. Gibson with three claims near the northern boundary of the reservetion; Edwin S. Masters with claims east and north of the reservation; Harold R. Crawford, Jr. and associates of Spokane with three mining claims north of the reservation; and Hunt Oil Company of Williston, North Dakota, and Grand Junction, Colorado. To expedite issuance of leases on the reservation itself, the Spokane Indian Tribe has been authorized by the United States Secretary of the Interior to lease its tribal lands for uranium exploration without adver-tising for bids. An amendment to federal regulations now provides that leases for minerals other than gas or oil may be negotiated and approved without advertising.

intersection develops the beds in order of their deposition, the first phosphatic strata being the Z bed, which is equivalent to the main bed being mined at the Waterloo mine of San Francisco Chemical near Montpelier, Material in the Z bed was found to be of satisfactory grade and thickness. Present work now involves footwall run arounds to intersect the Z bed for drifting north and south of the intersection point. John S. Wright is underground manager of mines.

Officials of Day Mines, Inc., Wallace, Idaho, which several years ago acquired the Gold Hunter property east of Mullan, have incorporated Gold Hunter Mining Company as an Idaho firm with \$200,000 capitalization. Incorporators included Henry L. Day, president of Day Mines,

Inc.



A second 400-ton milling unit now is in operation at the Glen tungsten concentrator of Minerals Engineering Company in Montana. Open-pit mining operations are being increased to about 20,000 tons monthly. Sixty men are working in mine and mill. R. N. Roby is mine superintendent.

Western Montana Exploration and Development Company is planning construction of a sink-float plant of 300 to 500 tons capacity. The plant would process ore from the Wasa-Shamrock deposit southeast of Hall, Granite County, Montana. Values are in lead, zinc, copper, cadmium, indium, tungsten, silver, and gold. Additional diamond drilling also is planned for the 1955 season. Dr. Roy W. Key of Missoula is president and managing director.

president and managing director.

Mitchell Mining Company, operating the Marget Ann mine near Butte, Montana has purchased Contract Milling Company from J. S. Huckaba, Spokane, Washington, metallurgical engineer, and J. G. Drent of Hall, Montana. A concentrator constructed at the property by the milling company has been treating Marget Ann ore. Mine production has been about 1,000 tons monthly.

Installation of the new service hoist at the Kelley mine of Anaconda Copper Mining Company at Butte, Montana, is rapidly nearing completion and is expected to be put in service shortly. The present service compartment in the main Kelley shaft will be converted so two ore skips can travel in that compartment. The present cage will be moved to the new service shaft, approximately 50 feet south of the present Kelley shaft, which is also nearing completion. Anaconda has also reopened its Belmont mine in Butte.

Donald Cameron Jr., Tomas J. Hallin, and T. T. Mozley are operating scheelite claims in the Crevasse Mountain district near Gardiner, Montana. Considerable exploration work was done before the winter snows hit the area, and about five tons of ore averaging 1.80 percent WO₈ had been stockpiled.



Sherman Creek Uranium Mines, Inc. of Republic, Washington has been organized to develop 29 mining claims in Ferry County's Sherman Pass area, where radioactivity was found last year in pegmatites. Bulldozing and diamond drilling are planned. The firm is capitalized at \$600,000. Incorporators were Burl G. Fowler, Republic mining man; Arthur J. Lane, Republic; R. R. Imbody, Ritzville; and William Gail and Paul E. Morrison, both Seattle.

The Stevens County flotation plant of Goldfield Consolidated Mines Company near Aladdin, Washington has been treating between 200 and 250 tons of ore daily. When zinc prices were good, production was 400 tons daily. Truman Higginbotham of Colville is manager.

General Ventures, Inc., of Spokane, Washington, has been formed to acquire and develop mining claims. Capitalization was listed at \$50,000 and incorporators as W. T. Anderson, Spokane; R. R. Weideman, Wallace, Idaho, and W. H. Simons, Moab, Utah.

North Meadow Creek Mines, Inc., Spokane, Washington, has been organized by Gordon and Laura Nichols and J. B. Cox, all of Spokane, with capitalization of \$100,000.

Danny S. Uranium Development Company, capital \$50,000, was incorporated by Joseph S. Skorupski, Fred Marshall and Ray M. Ramsey, all of Spokane, Washington.

50 years experience in exploration and development



Boyles Bros. half century of experience and know-how has been called upon extensively in the Nation's uranium production effort. Pictured above is the shaft of the North American Uranium and Oil Co... a shaft-sinking job by Boyles Bros. in the Moab area. Boyles Bros. leadership has also been long established in DIAMOND CORE DRILLING, GROUTING, ROCK BREAKING, MINING, QUARRYING and TUNNEL DRIVING.

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AEC to Open Ore Station Near Green River, Utah

A new uranium ore-buying station and sampling plant will be established by the United States Atomic Energy Commission at Green River, in east central Utah. Construction of the facility will start soon and will be completed early this summer.

The new sampling plant will consist of a semi-portable crushing plant, employing automatic sampling procedures. It will be situated on a 110-acre tract of land just across the Green River east of town.

Buying schedules will be announced by the AEC prior to the opening of the new buying station, which will be operated by the American Smelting and Refining Company. The station will provide a market for the increasing tonnages of uranium-bearing ores being mined in the San Rafael, Henry Mountains, and Green River district of central Utah.



Two Sikeston, Missouri brothers, David M. and Stanley W. Barton, have announced a uranium find on their Pay Day Group claims, 12 miles west of Uravan on the west bank of the Dolores River. Development work on two of the 38 claims has blocked out a reported \$1,500,000 worth of ore. The brothers are starting to drive five drifts on their Point Empire No. 1 and 2 claims, the site of their original ore find. They also plan an immediate additional 5,000 feet of drilling. The claims are being worked on a 24-hour basis, with 22 miners, plus drilling crews. Mining superintendent is William Doertenbach, Pueblo. Fred Hohne, Minerals Exploration Research Corporation, is geologist for the firm. The brothers, under the name of the Barton Uranium Company, have established offices in Grand Junction's new Uranium Center.

Work should begin this spring on Union Oil Company of California's \$5,000,000 pilot shale oil extraction plant in northwestern Colorado. The United States Bureau of Mines experimental mine near Rifle, Colorado is now in the process of being closed down. Union Oil has approved a two-year research and development program in the development of at least 5,000,000,000 barrels of shale oil reserves from the 50,000 acres the company owns. This is approximately eight times the firm's present proved controlled crude oil reserves. A 1,000-ton per day retort is planned for the Colorado property by Union to determine size-range and quality-range of oil shale that can be handled. The pilot plant is also expected to provide information necessary to design the entire plant, including crushing and retorting of Colorado shale and subsequent refining to produce a commercial shale oil.

Three Durango, Colorado uranium prospectors, with financial backing by a group of Denver businessmen, are developing claims in La Plata Canyon, 20 miles from Durango. The property, including 35 claims blanketing both side of Basin Creek, contains a three-foot wide bed of ore at the surface. Junior C. Morris, one of the prospectors, is mine superintendent. Others connected with the findings are Kenneth Owens and Arthur Puffer.

Garth and Vance Thornburg, owners of the Thornburg Mining Company, have purchased eight claims in the Cochetopa area of Saguache county, Colorado. The claims were bought from Nat and Muriel Gould for \$50,000 plus a 15 percent production royalty. The property, known as the Elisha group, is located northwest of the Los Ocho group now being developed by the Thornburgs.

William J. Carey, Texas oilman who recently opened offices in Grand Junction, Colorado, and Climax Uranium Company, Climax, Colorado, have entered into a joint exploration and development contract. Under terms of the agreement Mr. Carey will spend between \$125,000 and \$150,000 drilling in search of uranium on claims owned by Climax. Properties included in the contract are located on the Lisbon Anticline, San Juan County, and San Rafael Swell, Emery County, both in Utah, and on Beaver Mesa, Mesa County, and Slick Rock mining district, San Miguel County,

both in Colorado. Mr. Carey is acting as operator during the exploration phase, and Climax will manage the production from any ore bodies that may be discovered.



Sabre Uranium Corporation, Grand Junction, Colorado, will start mining uranium ore on its Utah claims within the next 30 days. The company will mine on the Lucky Strike claims in the San Rafael Swell, west of Temple Mountain. To date, 4,000 feet of an 8,000 foot exploratory drilling program has been completed, Uranium oxide content of the ore runs as high as 0.60 percent. Thickness of the ore varies from three to nine feet.

Approximately 40,000 tons of ore were produced by Consolidated Uranium Mines, Inc., Colorado Plateau uranium, vanadium and tugsten mining firm, from August 1954 through January 1955. Gross income from this ore is estimated at \$1,140,000 by the company in a February report to its stockholders. The company anticipates monthly production



MERCO To Seek U.O. for American Exploration

A \$100,000 exploration contract with American Exploration Company of Grand Junction, Colorado, has been signed by Minerals Exploration Research Corporation (MERCO), Grand Junction aerial color photographers and geophysical engineers. Shown above is the twin-negine Beechcraft autifitted with cameras and other uranium exploration equipment, which Sigurd K. Herness, MERCO president (right), is using in this contract with American Exploration Company. He is being congratulated upon the contract by R. M. Tomb (left), president of American Exploration Company. MERCO will undertake airborne and ground geological and geophysical investigations for all American Exploration holdings on the Colorado Plateau and elsewhere. Much of the work will consist of aerial color photography to delineate hydrothermally altered areas favorable for uranium ore localization, including use of aerial scintillation equipment, ground geology, and geophysics. MERCO also has been retained by the Southern Pacific Rail-road Company to set up its exploration department and advise it in exploration activities. Recently the company completed geological investigations and drill-hole recommendations on the Thornburg Los Oches property near Gunnisen, Colorado. Besides Mr. Herness, others in the MERCO firm include: Fred C. Hohne, formerly with Dulaney Mining Company and the Navaja Uranium Division of Kerr-McGeo Oil Industries, Inc.; Charles E. Melbye, formerly of the mining geology staff of the Colorado School of Mines; Stuart S. Mervin, who was with Potash Company of America, Kennecott Copper Corporation, and New Jersey Zinc Company; and Gerald E. Gould, past geologist with the New Park Mining Company and consultant to Kennecott.

of 15,000 tons before this summer. Operating offices for the Salt Lake City, Utah firm are located at Green River, Utah, Bull Canyon, Colorado, and Mineral Mountain, Colorado.

At the Radon group in the Big In-dian district, Hecla Mining Company, Wallace, Idaho, is constructing a surface wanace, nano, is constructing a surface plant in preparation for sinking a 700-foot, three-compartment, vertical work-ing shaft. The shaft, to be deepest on Colorado Plateau, will reach a large bedded uraium deposit diamond drilled by U & I Uranium Corporation. Work will be on a three-shift basis, six days a week and progress is expected to be about 200 feet monthly.

New Silver Bell Mining Company, Almire, Washington, has acquired a half Almire, Washington, has acquired a half interest in the 29-claim uranium prospect between Hanksville and Hite in the Henry Mountains area. The interest was obtained from Highland-Surprise Consolidated Mining Company, Wallace, Idaho. Coring is scheduled to start soon under the direction of Tibor Klobusicky, Highland-Surprise superintendent.

Ventures, Ltd., a Canadian-American firm, is reported to be shipping uranium ore from its claims in Mineral Canyon, four miles south of Dead Horse Point near Moab, Utah. A six- to seven-foot ore body was reported by the firm.

Jack Turner, Moab, Utah, heads the w Uranium Association of America. new Uranium Association of America. The group held an organization meeting in Washington, D.C. recently with the announced purpose of assisting the defense program of the United States by helping to obtain greater productivity and increasing stockpiles of uranium from a healthy and effective uranium industries. dustry.



Lucky Mc Uranium Corporation is ex-Lucky Mc Uranium Corporation is expected to step up production at its Gas Hills operations in Fremont County, Wyoming, as a result of the opening of the United States Atomic Energy Commission's Riverton, Wyoming ore buying depot March 1. Thomas Harrison has resigned from the staff of the United Park City Mines Company and has been added to the Lucky Mc staff. The firm plans to start an intensified drilling operation to outline ore bodies and prove sufficient reserves to justify a sizeable milling operation.

Hughes Mining Company, Salt Lake City, Utah, plans to construct a uranium upgrading mill on its Gas Hills property in central Wyoming. A \$100,000 installation is planned and production is projected for late this year.

A trial run for the production of a A trial run for the production of a lightweight aggregate is underway at the Great Western Aggregates, Inc. plant in Laramie, Wyoming. The plant is processing a bloated shale which results in a light, strong aggregate used in cement products. Great Western is also investigating the possibility of using some of the facilities of the plant for the reduction of titanium and uranium ore and processing of mineral food phosphates. processing of mineral feed phosphates.

Payment of the largest price vet reported for a single uranium claim in the Gas Hills area of Fremont County, Wyoming, was confirmed by Mountain Mesa Uranium Corporation, which paid Mesa Cranium Corporation, which pairs \$10,000 to two Lander part-time prospectors. Receiving the payment were Harold Evans and Clyde Rowe for the Ev-Ro claim in the Puddle Springs area. The two men will receive a maximum of \$120,000 in corporation for the claim. \$170,000 in ore payments for the claim, which contains 16 acres. Mountain Mesa is presently producing ore from the Blarco claims less than a mile to the southwest of Ev-Ro.

The new uranium ore buying station constructed at Riverton, Wyoming, by the United States Atomic Energy Comthe United States Atomic Energy Com-mission was formally opened March 1. It is being operated by the American Smelting and Refining Company, with Charles Brunner, formerly in charge of the ASARCO-operated Edgemont, South Dakota buying station, as manager, Five loads of ore were delivered during the opening ceremonies, including two from the Lucky Mc Corporation mine. Other loads included one by Mountain Mesa Uranium Corporation, one by Kiser-Allard Uranium Company, and one by the Little Missouri Mining Company.

The Intermountain Chemical Company, Green River, Wyoming, has completed its first year of operation, and manager C. A. Romano reports that the soda ash mine and processing plant ran at between 85 and 100 percent of capacity during 1954. Annual output is running around 300,000 tons of soda ash.

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Appalachian Developing Carolina Copper Prospect

An \$800,000 program of shaft sinking and lateral development work is sched-uled for the Ore Knob copper prospect uled for the Offe Kind Copper prospect of Appalachian Sulphides, Inc., a wholly owned subsidiary of Nipissing Mines Company Ltd. of Toronto, Canada, in Ashe County. North Carolina. The Ashe County, North Carolina. The three-compartment shaft will be sunk to

The Ore Knob ground is held under option by Appalachian which acquired it option by Appalachian which acquired it from Vermont Copper Company. Surface drilling has indicated about 1,219,700 tons of ore averaging 3.09 percent copper, 0.09 percent zinc, 0.036 percent cobalt, and 14.29 percent sulphur, with small amounts of gold and silver.

Vermont Copper had a contract with the Company Services Administration for

the General Services Administration, for the delivery of 12,000,000 pounds of refined copper to the government during 1954 and 1955 from its Vermont mines. Appalachian has requested and received release from this contract.

Penn Salt To Develop Kentucky Fluorspar Areas

The Pennsylvania Salt Manufacturing Company has incorporated a new, wholly owned subsidiary, Calvert City Chemical Company, to develop mining and milling operations at Salem and Mexico, Ken-tucky. With construction already in progproduction is expected from the new facilities by the end of this year.

This new project is intended to provide a long-range supply of acid-grade fluor-spar for Penn Salt's fluorine chemicals plant at Calvert City, Kentucky. Opera-tions of the new company will be inte-grated with the activities of the Calvert City Works.

National Lead Acquires Large Florida Tract

The National Lead Company has purchased a large tract of land in Brad-ford County, Florida, and this has led to speculation about a third large ilmenite mining operation in the area. The Humphreys Gold Corporation is operating two projects for E. I. duPont de Nemours & Company at Trail Ridge and Highland. The tract covers 6,816 acres, and was

The tract covers 6,816 acres, and was sold by St. Mary's Kraft Corporation of New York for \$272,640. The land is situated in Duval, Baker, Bradford, and Clay counties. Although details are incomplete, it is believed that the lands are continuous in location and that the Bradford County land would lie west of Highland.

Highland. National lead is engaged in mining minerals from Florida beach sands, and it is assumed that the company has purchased this tract to expand operations. It established a laboratory at Starke (Bradford County) several years ago and conducted extensive test drilling operations in the area north of there.

The company also once conducted mining operations along the Florida coast in what is now Ponte Vedra Beach; and mines ilmenite at Tahawus, New



For the first time, the Lead Industries Association and the American Zinc Institute will hold a joint annual meeting. The groups will meet at the Drake Hotel in Chicago, April 27-29. The first day (Wednesday) will be confined to activi-ties of the lead association only. On Thursday morning, a joint session will discuss the outlook for both industries; Thursday afternoon and Friday morning will be devoted to the zinc institute.

Louis O. Macloon has acquired the Lucky Dog zinc mines at St. Joe, Arkan-sas, together with a 100-ton-per-day con-centration plant. The operation was closed down by previous operators last year when the low price of zinc forced the closing of many mines in the Tri-State area. Diamond drilling reportedly has disclosed an ore body 27 feet below the surface, and to a depth of 63 feet. The ore is said to contain from 10 to 18.5 percent zinc, and substantial silver. A flotation circuit will be added to the mill for silver recovery, if warranted. Additional land is being leased in the surrounding area, after some radioactivity was disclosed on the Lucky Dog property itself. Mr. Macloon also has copper holdings at Caborca, Sonora, Mexico, and some tale deposits in Alexander County, North Carolina.

Bear Creek Exploration Company has been formed by a group of North Dakota

men-Bernard Engesser, Charles Bowman, Oscar Overkand, and Vernon Bull-to seek uranium. Some work is now being done by Caterpillar tractor and bull-dozer on company leases near Riverton, Wyoming.

John Q. St. Clair, a geologist, has acquired leases on about six-sevenths of a 70 to 80-acre tract and is reported to be negotiating with a large United States mining firm to finance him in reopening the old Pike County, Arkansas diamond mine. The property is 2% miles southwest of Murfreesboro, Arkansas, and diamonds were first discovered on the tract by a farmer in 1906. The remainder of the tract is being operated as a tourist attraction. Mr. St. Clair plans an intensive sampling program and if the results are satisfactory, a mill will be established which will use the new diamond recovery methods devised in the South African fields. Mr. St. Clair is former manager of Boart Production, Ltd., a subsidiary of the DeBeers diamond mine operations.

Mineral Mining Company is planning to drill more than 140 test holes in a 600acre tract about eight miles south of Medora, North Dakota for uranium.



Construction of Cramet, Inc.'s titanium facilities at Chattanooga, Tennessee has been right on schedule with initial pro-



Erie Mining Company Photograph

Winter Weather Doesn't Hinder Erie Project

Winter's icy grip can be seen in the picture above of the Erie Mining Company's concentrator site under a blanket of snow, but it did not stop operations at the huge \$300,000,000 teconite project near Aurora, Minnesota. Despite the freezing temperatures, icy winds, and snow-covered land, work progressed on all phases. Excavations for plant buildings, for a 73-mile railroad, and for a new harbor at Two Islands moved ahead steadily. In the middle of winter, nearly 4,000 men were employed. The project is a joint undertaking of Bethlehem Steel Corporation, Youngstown Sheet and Tube Company, Interlake Iron Corporation, and the Steel Company of Canada. Pickands Mather & Co. will be the operating agents for the project which is designed to produce 7,500,000 tons of taconite pellets annually. Largest building at the plant site is the concentrator (above). The building is to be built on several levels on one side of a hill. During the last half of 1954 more than 500,000 cubic yards of rock were removed to transform the hillside into a series of huge steps. The first concrete forms for the foundation were poured. Construction of the power plant will start this year.



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duction of titanium sponge starting in January. The plant was more than 50 percent complete by the end of 1954, and first sales of sponge titanium from the plant were made in January so the contract commitment with the government has been fulfilled. When fully completed it will be the first United States titanium sponge manufacturing facility planned and constructed as an integrated unit on a new site with its own specially designed buildings, equipment, services, and utilities. The plant takes in titanium-bearing ore and converts it by chemical processes to titanium sponge. Part of the raw material will be supplied by another Crane Company subsidiary, Marine Minerals Inc., which will operate a connected bucketline dredge in North Carolina.

International Minerals & Chemical Corporation's Florida Phosphate Minerals Division has initiated a new program called "operations research". The new project is considered "a scientific approach to business problems" and is expected to develop a basis for planning the economical operation of the business. They will study the entire operation in an attempt to see where new methods may be employed to determine maximum operational efficiency and maintain it. Assisting in this work will be the firm of Jack Dunlap & Associates of Stamford, Connecticut.

Chesapeake & Ohio Railway is constructing a new \$8,307,000 bulk materials inloading facility at Newport News, Virginia. This new facility will be 711 feet long with three unloading cranes, each capable of handling 15 tons of bulk material every 45 seconds. Heavy import traffic, largely iron ore from Venezuela and Labrador, has made the new installation necessary.

The United States Atomic Energy Commission has awarded a \$29,220 one-year contract to the University of Tennessee Department of Geology and Geography for continuation of studies of the Tennessee uranium-bearing Chattanooga black shale. This is the fourth contract for the University where basic field work has been completed but where at least another year of rechecking, analyzing, and synthesizing of the data is necessary.

Kaiser Aluminum & Chemical Corporation's Chemicals Division will begin construction of a \$4,000,000 plant early in April to produce basic refractories at Columbiana, Ohio. It is scheduled to be completed and in operation late this year. The raw materials to be used are chiefly periclase and chrome ore. The periclase, which is a high-purity calcined magnesia, will be supplied from Kaiser Chemicals Division's fully integrated raw materials plants. The chrome ore will be imported from the Philippine Islands.

Working on a supposedly "small" mica deposit near Cowee Township in North Carolina, miners made one of the largest mica strikes in recent years. Minerals Processing Company of LaGrange, Georgia, owner and operator of the property, reports that the block mica yielded is of exceptionally high quality.

Four geophysical investigation maps showing radioactivity anomalies detected during airborne surveys in South Carolina, Georgia, and Florida have been released to the public. The surveys were made last spring as part of a program of airborne reconnaissance for radioactive

materials conducted by the United States Geological Survey for the Atomic Energy Commission. The surveys were made in the Edisto Island area, South Carolina; near Folkston, Georgia; and in Charlotte, Lee, DeSoto, Hardee, Manatee, and Sarasota counties, Florida.



Cleveland-Cliffs Iron Company is planning a new fines beneficiation plant for its Holman-Cliffs property. The new plant, using either jigs or cyclones to treat minus-k-inch feed, is scheduled to be built next fall for operation in 1956. The huge Mather mine was again CCl's biggest shipper last year, producing twice as much ore as any other of the company's mines. Total company production was 5,131,514 tons; of this, the Mather produced 1,535,800 tons.

A proposed iron ore tax boost in the state of Minnesota will face stiff opposition in the Legislature. The proposal comes from the governor who is seeking additional revenue to balance the budget. It is proposed that the tax be increased from 12 percent to 16 percent of the value of ores mined. Iron ore taxes provide about one-sixth of the general-fund revenues of Minnesota, and the state produces over half of the iron ore mined in the United States. Among the arguments against this is the contention of the legislature's tax commission that iron produced from Minnesota already costs more delivered at Pittsburgh than iron from Venezuela and Labrador-Quebec ores.

W. S. Moore Company expects to have its new HMS and Jig plant in operation at the O'Brien mine near Nashwauk, Minnesota by the start of the 1956 ore season. Western-Knapp Engineering Company is presently engaged in designing the new plant. A spur is being graded for the Great Northern Railway to serve the new concentrator. W. F. McDermott, superintendent of plants for W. S. Moore Company, is in charge of coordinating the engineering work on the new plant.

First results of a survey aimed at locating new Minnesota water supplies to aid the processing of taconite have been released by the United States Department of the Interior. The study is being conducted jointly by the U.S. Geological Survey and two Minnesota agencies, the Iron Range Resources and Rehabilitation Commission and the State Conservation Department's water division. The maps will not be distributed but may be inspected in Washington or at the St. Paul office of the U.S. Geological Survey.

Jones and Laughlin Steel Corporation's Minnesota Ore Division will put the Schley mine back in production this season after having it shut down at the end of the 1953 season because of lack of demand for the high alumina ore it produces. Stripping has also been resumed at the nearby Pittit mine with plans to make initial shipments of ore during the coming season. Both mines are located near Gilbert, Minnesota.

So. Pacific Will Explore And Map Railway Land

The Southern Pacific Company, one of the nation's largest railroads and, incidentally, one of the largest individual owners of land in the western United States, has started a major geological exploration and mapping program under jurisdiction of its Land Commissioner, L. Frandsen. The program was organized and is being supervised by Southern Pacific Company's geologist, W. C. McCulloch.

Under this program, crews of specially trained geologists will map and evaluate all SP land in California, Nevada, and Utah.

Lawrence B. Wright, well known San Francisco geological engineer, has been appointed chief of exploration. Under his guidance SP has established training headquarters at Barstow, California, where geologists are being trained and given field mapping experience while actually mapping railroad land. The training program is being supervised by Minerals Exploration Research Corporation of Golden, Colorado. The Barstow site was picked because of its climatic advantages; mineralization is found in both igneous and sedimentary rocks, and the area has typical geologic structures.

the area has typical geologic structures. Field work will be carried on throughout the year by transferring operations to fit the varied climatic conditions in desert and mountain areas. The work encompasses geological investigation, to be followed by such geophysical and other modern mineral prospecting procedures as are indicated as being necessary to obtain a mineral inventory of ownership.

AEC Ore-Buying Station To Open Near Globe, Ariz.

A new uranium ore-buying station and sampling plant will be established by the U. S. Atomic Energy Commission at Cutter, Arizona, eight miles east of Globe in the south central part of the state. A site has been acquired by lease from the San Caros Apache Tribal Council and construction of the facility will start soon.

To be operated for the commission by

To be operated for the commission by the American Smelting and Refining Company, the sampler will be a semi-portable crushing and sizing plant employing automatic sampling procedures. Buying schedules will be announced by the commission prior to actual opening of the plant, probably in May or June.

The new buying station will provide a market for the increasing tonnages of uranium-bearing ores being mined in that area, and also is expected to stimulate further the exploration for and development of ore deposits.

The site of the proposed buying station is a 136-acre tract on U. S. Highway 70 east of Globe and across the highway from the Globe Municipal Airport.

Kennecott Finds Copper Ore Body Near Deep Ruth

A 1,000,000-ton copper ore body has been discovered by the Nevada Mines Division of Kennecott Copper Corporation in the course of development of the \$12,000,000 Deep Ruth underground mining project in White Pine County, Nevada. The ore in the new discovery, the Minnesota Hi, reportedly assays 1.175 percent copper (23.5 pounds) per ton.

Discovery of the Minnesota Hi ore body means revision of the original plans for mining the Deep Ruth. It will be necessary to mine the Minnesota Hi before block caving the Deep Ruth since part of the newer find is within the block caving area. Work on the Deep Ruth may be postponed for as much as two years.

The company plans to reopen the historic Star Pointer Shaft of the original Ruth mine, one of the oldest mines in eastern Nevada, in order to reach the Minnesota Hi.

Development work on the Deep Ruth started in 1951. The ore body contains about 20,000,000 tons of ore averaging 0.85 percent copper (17 pounds) per ton. The ore body had been found by underground drilling in 1937. Two shafts are being sunk to reach and mine the Deep Ruth ore—the Kellinski, an incline shaft, and the Deep Ruth. The two shafts will connect on three production levels—the D, E, and F. The Deep Ruth shaft is now down below 1,360 feet, or 546 feet below the first production level—D, nearly reaching the bottom F level. The Kellinski has reached a depth of 1,350 feet on a 55° slope, placing the bottom of the shaft at about 100 feet below the D level intersection. Main drift approach-

ing the Deep Ruth from the Kellinski on the D level has been driven nearly 3,700 feet, leaving about 700 feet to go before the two shafts are connected. The Star Pointer shaft lies between the two.

Freeport and Pittsburgh Form New Potash Company

The National Potash Company has been formed by Freeport Sulphur Company and Pittsburgh Consolidation Coal Company to mine potash from a \$19,000,000 project to be developed near Carlsbad, New Mexico." (See MINING WORLD, March 1955, page 43.) The plant will be designed to produce about 400,000 tons of potash salts a year, equivalent to 250,000 tons of potassium oxide. Production is expected to begin in 1957.

National Potash has arranged to borrow \$12,500,000, from an insurance firm, while Freeport Sulphur and Pittsburgh Consolidation each will supply half of the remaining capital. Richard C. Wells, vice president and controller of Freeport Sulphur, will be president of the new firm; Thomas C. Ferguson, formerly a vice president of one of Pittsburgh Consolidation's divisions, will be operating vice president.



Hycon Aerial Survey Uses Varian Magnetometer

Exclusive world-wide rights for use of the Varian Earth's Field Magnetometer have been granted to a new company—Hycon Aerial Surveys of Pasadena, California. This magnetometer was selected as "The Exploration Tool of 1954" by MINING WORLD in its Drifts and Crasscuts section of the December 1954 issue. Shown holding the new magnetometer's field magnetic pick up sensing "Bird" in the photograph above are Russell Varian (right), president of Varian Associates, and Alden E. Acker, president of Hycon Manufacturing Company. Varian Associates and Hycen Manufacturing Company have set up the new firm to build, fly, record, and interpret data from the magnetometer. The magnetometer uses a new concept of physics for measuring weak magnetic fields. Hydrogen nuclei are used to record minute magnetic changes. Calibration is a constant based on the hydrogen atom's nucleous, so the new magnetometer is simple to build and maintain, is small, and is also light in weight. One of the most important advantages of the Varian magnetemer is that no gyrescopic stabilization is needed for operation and reading of total field intensity. Position, inclination, or direction of the "Bird" do not have to be carefully controlled because the instrument measures total magnetic field without regard to direction. Varian Associates has been in the field of applied physical sciences since 1948, specializing in klystren research end production, and in nuclear magnetic resonance instrumentation. Hycon Manufacturing Company is an important acrial camera maker and aerial mapper.



Utah Construction Company is reported to have made its first entry into the uranium field through a recently negotiated agreement with Comstock Oil of Uranium Company of Salt Lake City and Santa Cruz Uranium Company of Nogales, Arizona. Utah will contribute \$250,000 to the venture and will operate the properties located midway between Tucson and Nogales in the Tyndall mining district, according to reports. Com-stock and Santa Cruz will each con-tribute \$125,000. The 20 unpatented claims have been surveyed and surface mineralization reportedly averages be-tween 0.6 percent and 1.0 percent uranium oxide. Mining will probably be by open pitting.

Cerro de Pasco Corporation is negotiating for the Old Dick copper-zinc mine near Prescott, Arizona. The property was acquired by McFarland and Hullinger in 1950, and subsequently turned over to Dr. Edwin L. Larson of Phoenix. It is the latter with whom Cerro de Pasco is reported to be negotiating.

tiating.

Don Lieberman Enterprises has completed construction of its tungsten mill in Tucson, Arizona. The plant has a daily capacity of 100 to 150 tons of ore, depending on the type of ore being handled, and will accept ores for treat-ment on a custom basis or will purchase

the ore. Scheelite, wolframite, hueb-nerite, and ferberite ores of domestic origin will be accepted for milling. Parorigin will be accepted for milling. Particular attention has been given to the
problem of sliming of scheelite ores
through the method of detouring fines
completely around the fine grinding circuit and through flotation. Electro-magnet separation will be used where indicated. Purchases of ores or concentrates
are being made from the producers as
of March 10, 1955 in small or large lots.

Lerry Delgado was instrumental in con-Jerry Delgado was instrumental in construction of the mill, and is remaining as mill superintendent. Complete operations are under the direction of Don Lieberman. The company has received inquiries in regard to processing of uranium ore and is presently working on that project.

San Manuel Copper Corporation has its administration offices from moved its administration offices from Red Hill near Tiger, Arizona to a new headquarters building at San Manuel. The old offices will be converted to mine headquarters. The townsite of San Manuel, including its 1,000 homes and most of its commercial property, has been acquired by Magma Copper Combeen acquired by Magnia Copper Com-pany, San Manuel's parent company. Developers of the town, Del E. Webb Construction Company of Phoenix and Aldon Construction Company of Bellflower, California and associates, re-ceived 23,375 shares of Magma stock for the transaction; reportedly this represents a value of \$1,650,000.

Spencer Uranium Company operating the Yazzia open-pit mine in Apache County, Arizona, has awarded a strip-ping contract to Enoch Smith Construc-

tion Company. The contract "extensive stripping and mining" of the property which is located 800 feet from the Monument No. 2 mine of the Vana-dium Corporation of America just south of the Utah border. Shipments reportedly are already being made to the Shiprock, New Mexico mill of Navajo Uranium Division, Kerr-McGee Industries Inc.

The famous old Monte Cristo silver mine, 13 miles east of Wickenburg, Arizona, purchased by Judge Edward B.
Ashurst in December, is producing. A
50-ton flotation mill is in operation, with the capacity of the mill already being increased by installation of rolls between crusher and ball mill, and by addition of flotation units. The mill is being operated three shifts per day. Development work in the mine is opening up silver deposits with some copper. The mine deposits with some copper. The mine workings develop three large veins— Amethyst, Mahoney, and Monte Cristo. There are 11 levels spaced at 100-foot intervals down the shaft. Don T. Garvin is in charge of milling operations, and Charles Kilpatrick is in charge of mining.

Charles Kilpatrick is in charge of mining.

The Thornburg brothers, owners of Thornburg Mining Company, report that they have already produced a 500- to 600-ton stockpile from development work on their Blue Rock property 31 miles east of Tucson, Arizona. Of the original 31 claims, all have been drilled under contract by Minerals Engineering Company of Grand Junction. The original 31 claims were purchased last year from R. M. and Robert Vanover, Leonard and Louis Hill, and Dominic Oberto for \$60,000 with an overriding rovalty. for \$60,000 with an overriding royalty.



The Thornburgs have spent \$100,000 in development work, which has included sinking a 57-foot shaft, an incline, and driving a tunnel. They now have 110 claims in the Blue Rock group. The discovery is in a hydrothermal deposit in pre-Cambrian shale. All Thornburg properties are operated by *Uranium Enterprises*, *Inc.*, Thornburg's management company.



International Minerals & Chemical Corporation has purchased all of the as-sets of U.S. Mining Company and Peer-less Perlite Company, Both of these firms are headquartered in Los Angeles, California. Their assets include large reserves forma. Their assets include large reserves of high quality perlite ore in Inyo County, a drying and grinding plant near Big Pine, and a perlite expanding plant in Los Angeles. The properties will be operated by the Industrial Minerals Division of International Minerals, under the supervision of Norma J. Dunbeck, vice president.

Hunt Agency of Richmond, California has introduced a new set of maps show-ing public lands in California where le-gal claims locations may be made. The firm lists a balance of almost 49,000,000 of a balance of almost 49,000,000 acres in public ownership or 49 percent of the state's total. Approximately 19,000,000 acres of this is open to all forms of settlement, principally through the federal government's Bureau of Land Management. The firm's address is 12416 San Pablo Avenue, Richmond.

More than 1,300 mining claim locations had been filed with the county recorder for San Bernardino County, Calfornia during the first month and a half of this year, and claims were pouring in at the rate of several hundred per day. They show a definite continuance of the prospecting fever which has hit the area since uranium was discovered.

The United States Atomic Energy Commission's Division of Raw Materials has opened an office in Room 558, Haberfelde Building, 1706 Chester Avenue, Bakersfield, California. The office is staffed by two geologists who check samples, offer exploration advice, and visit properties that warrant their attention



Errington and Thiel of Elko, Nevada are leasing a rare metals deposit 65 miles south of Wells, Nevada to U.S. Uranium of Salt Lake City, Utah, for \$500,000. Air-float separation is planned. The minerals-mica, beryl, autunite, lithium, and garnet- are found in extensive pegmatite dikes on 50 claims.

A promising uranium deposit is reported in the Rye Patch area, east of Tonopah, Nevada where four partners have been doing extensive diamond core drilling on about 2,000 acres. George E.

Rapattoni, George J. Fell, Russ Kirsan, and Carrol E. Carrigan located their ground after extensive aerial surveys in a Super Piper Cub over the Tonopah area for four months. The drill holes have been down more than 100 feet "with prospects looking better all the time." AEC officials are reported to be plan-ning a visit to the property in the near

Tonopah United Uranium, Inc. has started an extensive exploration and destarted an extensive exploration and de-velopment program on its large block of claims north of Tonopah, Nevada and also near Coaldale and Fish Lake. Com-pany holdings are said to include the Blue Opal, Eagle, Victory, Bomber, and MVW groups. A new Homelite compres-sor and a Sullivan No. 34 core drill have been purchased for the work. President of the firm is Rex B. Yeager of Beverly Hills, California; Charles M. Ross of Los Angeles is vice president and secretarytreasurer.



The recently formed central Mexico section of the AIME will hold a section meeting at Grants April 29 and 30, to tour Anaconda Copper Min-ing Company's uranium processing mill at Bluewater and the Haystack Mountain

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Development Company's mining opera-tion at Haystack Mountain north of Prewitt. Officers of the group, which has 110 active members, are John A. Wood, Chapman & Wood, chairman; Alvin J. Thompson, head of mining and metallurgy, New Mexico Institute of Mining & Technology, vice chairman; A. B. Woodward, Jr., New Mexico Engineering Company, secretary.

Sabre Uranium Corporation, with large uranium holdings in Colorado and Utah, has located high-grade ore on Sabre claims in the Grants area of New Mexico. After approximately 20,000 feet of drilling on one 640-acre section, probor drilling of one 640-acre section, probing indicated the presence of ore as high as 1.00 percent U₀O₈, the company reports. Exploratory work will be continued to determine the full size and extent of the ore body.

In order to avoid conflict with other In order to avoid conflict with other scheduled meetings, the ninth annual meeting of the New Mexico Geological Society will be held in Gallup, May 13, 14, and 15. (Original dates planned had been April 29, 30 and May 1.) A special uranium field trip through the major mines of the Grants district will highlight the event. For further information contact the New Mexico Geological Society at Box 219, Albuquerque.

Sapphire Petroleums, Ltd. has signed an agreement with a four-company group headed by Freeport Sulphur Company. The agreement must be approved by the United States Department of the In-United States Department of the Interior since it involves prospecting for uranium on 160,000 acres of land belonging to the Acoma Indian Tribe. Sapphire was the winning bidder for uranium prospecting rights: Freeport had also bid. Under the agreement, the Freeport group will do the prospecting and Sapphire will get a 25 percent share in any discoveries. Members of the Freeport group also include White, Weld & Company, Panhandle Oil Corporation, and White Eagle Oil Company.

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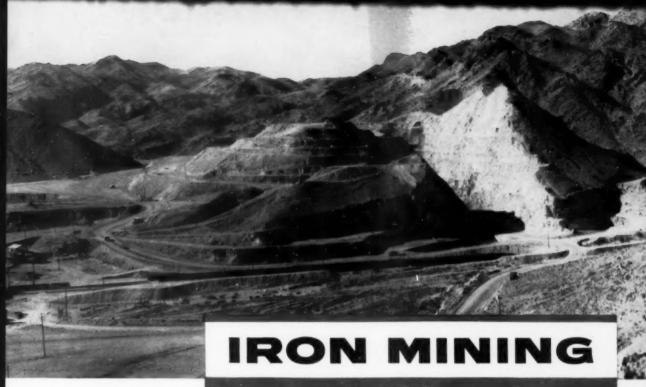
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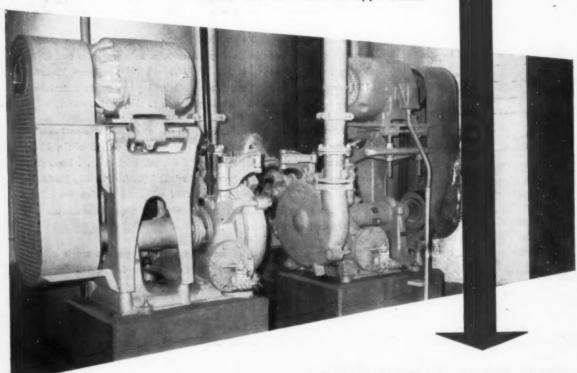
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